AUGUST 17, 1953

NEWS ISSUE

Electrical World

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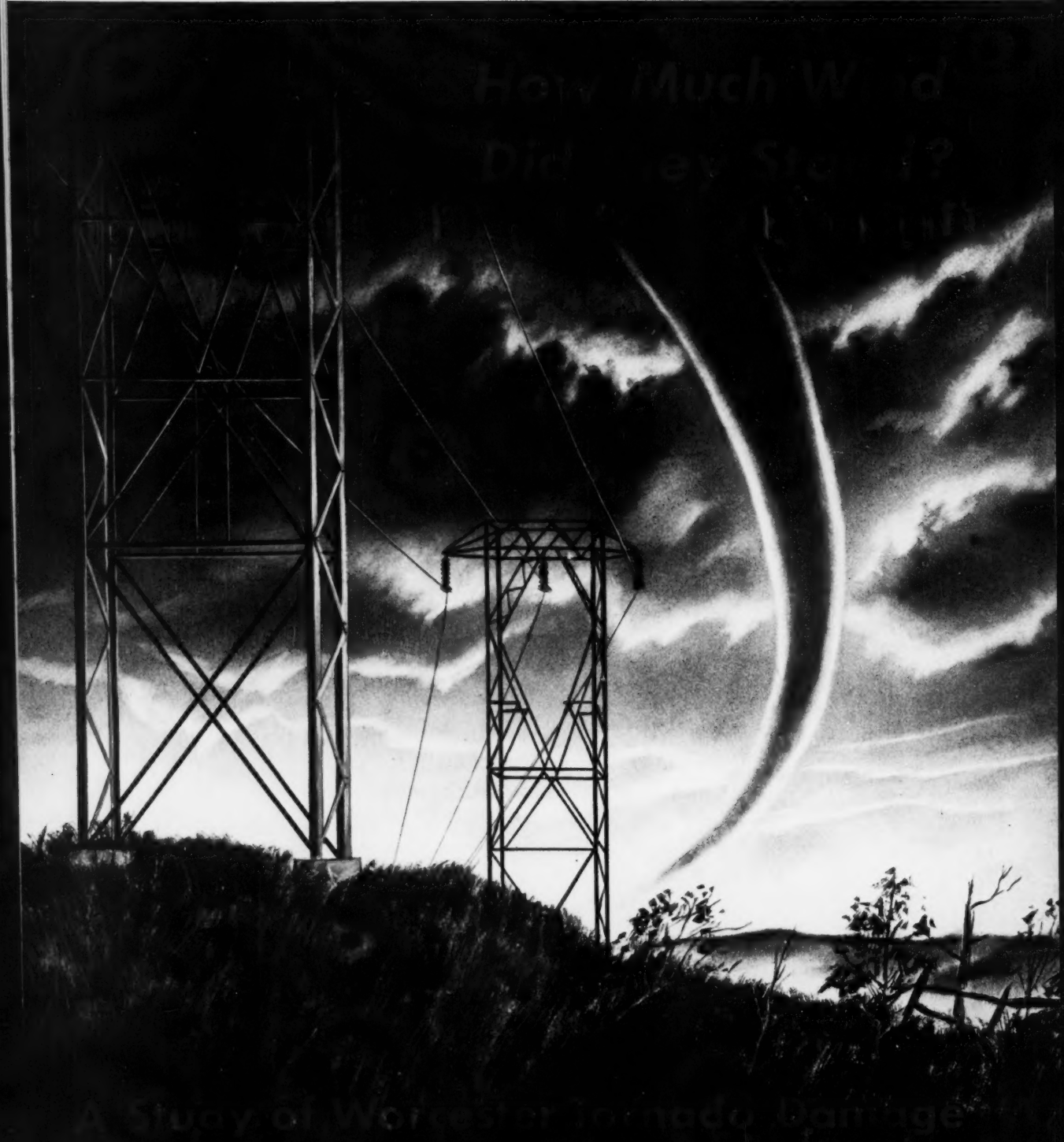
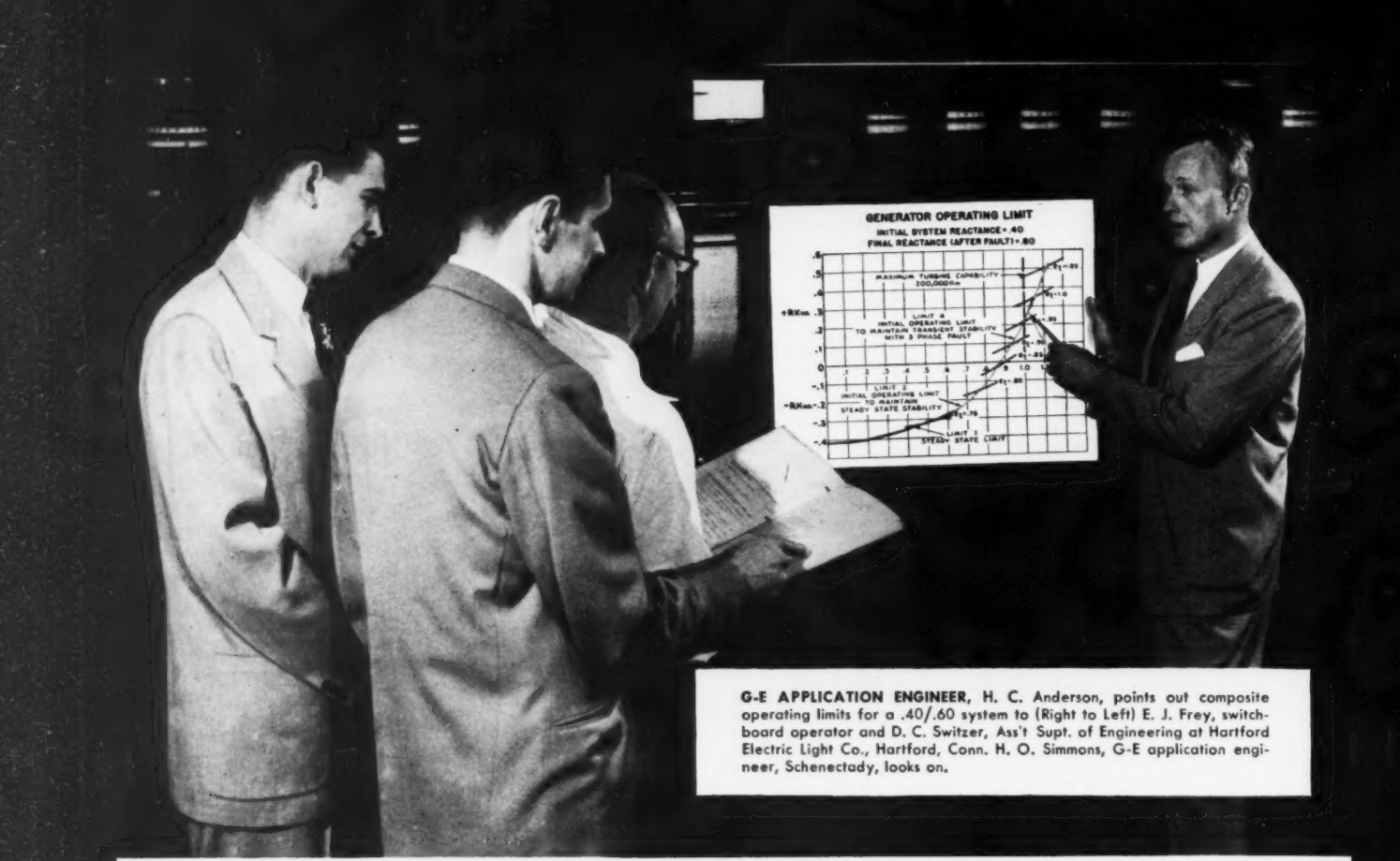
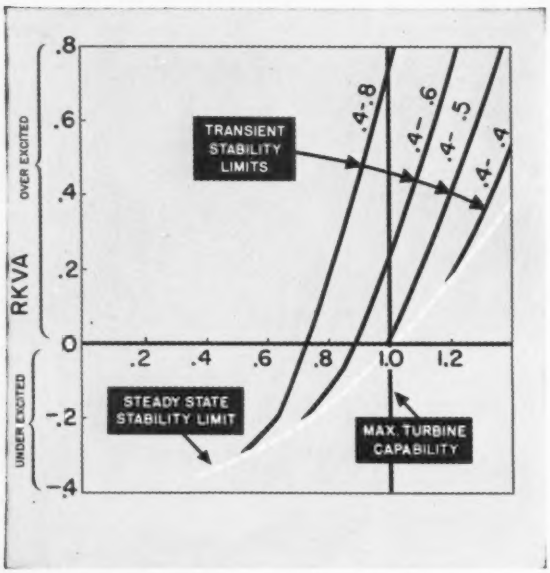




G-E APPLICATION ENGINEER, H. C. Anderson, points out composite operating limits for a .40/.60 system to (Right to Left) E. J. Frey, switchboard operator and D. C. Switzer, Ass't Supt. of Engineering at Hartford Electric Light Co., Hartford, Conn. H. O. Simmons, G-E application engineer, Schenectady, looks on.

New approach to system stability—

G-E ENGINEERING STUDIES HELP BOOST STATION OUTPUT, CUT OUTAGES



COMPOSITE LIMIT GUIDE, reactive KVA vs. KW, for generators on all systems with an initial reactance of .40. Solid black lines show specific generator excitation limits for systems with final reactance, after fault, of from .40 to .80.

Studies of power system stability, conducted by General Electric application engineers, today are helping utility companies obtain maximum kilowatt output from generating stations while minimizing the danger of system instability following severe faults, which could result in complete station shutdown.

Rapid system expansion and longer transmission distances, with the accompanying increase in system reactance, call for new attention to problems of system stability. This is particularly true if the system is split and/or reactors are added to prevent increases in circuit breaker interrupting requirements.

Operating guides developed from system studies now provide power station operators with a simplified means of keeping generator operation within known limits of stability. Setting up a minimum kilovar limit for any kilowatt output, these guides can be used to quickly estimate stability limits, insuring full utilization of generator capability as well as providing a tool for planning future system expansion.

Application engineers in G-E Apparatus sales offices can help apply these modern practices on your system. For full details write for GET-1972, General Electric Company, Section 301-232, Schenectady 5, N. Y.

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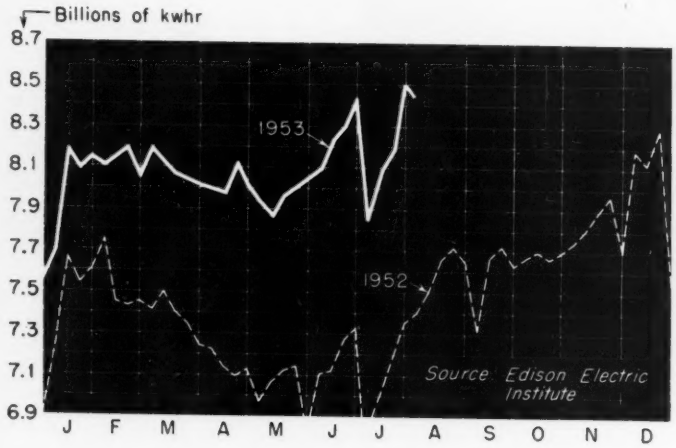
GENERAL ELECTRIC

VOLUME 140, NO. 7

August 17, 1953

Electrical World



Output Week Ended Aug 8—8,463,616,000 Kwhr

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Aug. 8	+12.9	+6.4	+5.6	+16.6	+11.2	+25.3	+7.1	+7.6	+8.8	+6.4
Aug. 1	+14.9	+9.5	+10.1	+21.3	+13.6	+22.5	+6.5	+9.4	+9.4	+10.1
July 25	+15.4	+11.1	+11.9	+20.6	+13.2	+20.3	+9.1	+10.0	+10.0	+14.9

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	May	73.5	72.9	65.9
Capacity (Million Kw)	May	84.34	83.84	77.01
Production (Billion Kwhr)	May	35.98	35.63	31.82
Hydro	May	10.29	9.70	9.69
Fuel	May	25.69	25.92	22.13
Fuel Consumption				
Coal (Million Tons)	May	8.59	8.91	8.01
Oil (Million Barrels)	May	6.09	7.15	3.72
Gas (Billion Cu Ft)	May	87.85	76.58	76.99
Sales (Billion Kwhr)	May	31.32	31.75	27.94
Residential	May	8.50	8.86	7.52
Commercial	May	5.18	5.15	4.74
Industrial	May	15.49	15.46	13.83
Other	May	2.16	2.28	1.86
Net Income Class A & B Companies ($ Million)	May	82.13	86.27	68.49
Estimated Dec. '53 Peak (Million Kw)	May	86.1	86.5	88.4
Kwhr per Residential Customer (12 Month Average)	Apr.	2,224	2,209	2,066
Revenue per Kwhr Residential Service (12 Month Average)	Apr.	2.76¢	2.76¢	2.79¢
Canadian Production (Billion Kwhr)	May	5.76	5.75	5.33

Business Statistics

FRB Industrial Production Index†††	June	243*	241	205
Gross National Product Annual Rate ($ Billion)	1st Qtr.	363.4	361.1	339.7
EW 5 Industry Production Index	June	130.4	130.0	97.1
ENR Construction Cost Index††	July	126.6	124.4	119.6
BLS Consumer's Price Index	June	114.5	114.0	113.4
NEMA Insulation Materials Sales Index†	May	631	694	517
NEMA Electric Appliance Sales Index†	May	299	317	219
NEMA Household Refrig. Sales Index†	May	158	188	128

*Preliminary **Revised †1936=100 ††1949=100 †††Unadjusted

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THE ELECTRICAL WEEK

The Issue's News Highlights—British are conducting tests on experimental cable laid in Channel to determine feasibility of cross-channel intertie with France . . . Hearings on Idaho Power's application to build three dams on Snake River are recessed until Sept. 21.

New Hoover Commission is expected to take a good look at the federal government's role in the power field . . . REA brings together Kentucky co-op and utility officials to try to solve a long-standing controversy.

Michigan's Department of Economic Development has sent all utilities in the state a questionnaire in connection with a survey of state power resources. Tabulation of results is expected to be ready about Oct. 15.

Duke Power makes contract with Mecklenburg tuberculosis sanatorium to supply power at 1.625¢ a kwhr as compared with present rate of 2.5¢ a kwhr supplied by town of Huntersville, N. C. Town buys power from Duke but adds a profit on the resale . . . St. Bernard, Ohio, to sell its electric plant to Cincinnati G&E for $655,000.

Upper Peninsula Power gets Michigan PSC approval to hike rates $236,500 a year based on 1952 operations . . . Pennsylvania House votes 84-to-51 against H.B. 627 which would have required rates imposed by municipal authorities to be approved by the PUC.

Community Public Service sells its Gainesville Coca-Cola Bottling Co, Crystal Dairy Products Co, and the Gainesville ice plant to local interests in Gainesville, Tex. . . . Central P&L leases its ice properties to Southern Texas Ice & Service Co.

Three heavy thunder storms within three hours on Aug. 4 caused 15 of Cleveland Electric's 4,340-v feeder lines to go out and 160 primary transformer fuses to blow out in Cleveland. Ten transformers were knocked out by lightning. In all, some 4,000 homes were left without power from a few hours to 16-17 hours.

Construction work is in progress on Virginia E&P's Roanoke Rapids hydro plant. Construction building, access roads, and railroad clearing have been completed. Tail race blasting of river rock (to raise head of dam 20 ft) will start soon . . . Carolina P&L plans to have a "little Nela Park" in its new Raleigh two-story district office which will include a meter laboratory. Sales office will have 125 maintained foot candles . . . A new club house (Lake Murray Club) is under construction by South Carolina E&G. Expected to be finished in October, rustic type building will have electric radiant heat.

Pennsylvania Coal & Coke buys Crescent Co, Inc, and Properties, Inc, Pawtucket, R. I., insulated copper wire manufacturers for automotive and electrical industries.

Scranton Electric and UWUA-CIO agree to 22¢ an hour wage increase but negotiations continue for upward revision of rates for other job classifications.

Off the Washington Wire—Senate critics of Republican power policy may have delayed a proposed administration statement on the subject. A power statement was prepared and sent to the White House early in August. But before it was made public, Senate critics blasted GOP power policy (EW, Aug. 10, p 91). Result: The administration statement was still under wraps last week.

Olin Industries, front-runner in the field to establish new aluminum production, is eyeing a possible power source in southern Illinois. It still has not ruled out use of char to fuel its generating plant . . . Fred H. Strong, assistant to REA Chief Ancher Nelsen, is now acting deputy director of the agency.

In a petition to intervene in Federal Power Commission's hearings on proposed rules for "Accounting and Reporting of Provision for Future Income Taxes Resulting from Accelerated Amortization," Virginia State Corporation Commission says the state, not the federal government, should determine how electric companies compute accelerated amortization.

Idaho Power plans to sell $105 million bonds, $27.4 million preferred stock, and $52.2 million common stock if it receives FPC approval to build the three hydro dams on the Snake River.

Off the New England Wire—New England Electric System names its new 150,000-kw Upper Fifteen Mile Falls hydro plant at Littleton, N. H., on Connecticut River, now under construction, the Moore Station, in honor of the late Samuel C. Moore, NEES pioneer and father of present president of NEES, Irwin L. Moore.

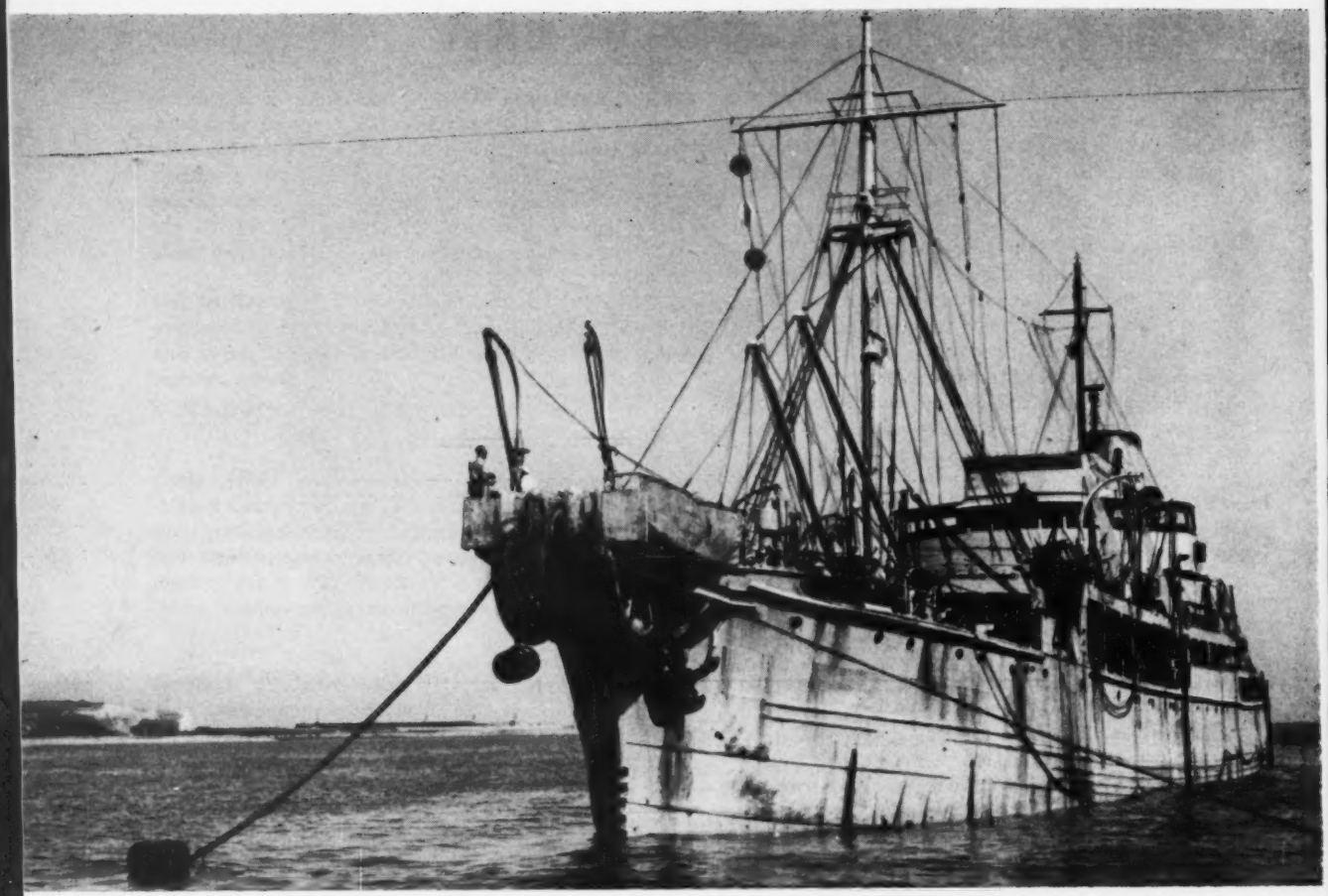
CBS-Hytron's employees vote 2,512 to 1,224 to defeat for fifth time a campaign by IUE-CIO to organize union set-ups at company's Danvers, Newburyport, and Salem, Mass., plants. Company's Pres Bruce Coffin said "we have tried to put people over machines in our thinking," as embodying the concern's labor policy.

Boston Edison's stockholders subscribed for 230,111 common shares of 246,866 offered on a 1-for-10 basis at $45 a share. In addition stockholders requested 78,269 common shares under oversubscription privileges, necessitating an allotment.

Milton H. Frank, Wisconsin P&L executive vice president, retires after 41 years in the utility business.

Congratulations—Consumers Power's Chairman Justin R. Whiting is named a member of Gov Williams' State Turnpike Commission until Feb. 28, 1959 . . . Southeastern Community Development Association elects F. A. Hood, Georgia Power Co, president . . . W. W. Lynch, president of Texas P&L, is named chairman of Region 13 for forthcoming USO campaign . . . Tacoma, Wash., Public Utilities Board appoints Alfred J. Johnson a director, replacing Joseph L. Long, Jr, resigned.

(*Continued on page* 10)



132-kv gas-filled submarine cable is paid out from the British ship Alert into the

pulled on to the beach . . .

hauled up a ramp . . .

Test Cable Is Laid In English Channel

Several lengths of experimental submarine cable were laid in the English Channel late last month to find out if an interconnection between the power systems of Britain and France is feasible (EW, July 20, p18).

A testing site has been established on the beach at Dover. There experiments will be carried out on two one half-mile lengths of British cable and one quarter-mile length of French cable laid in the Channel by the British Post Office ship "Alert" and jointed at sea. Whole length of cable will be subjected to 300,000 volts of direct current.

British cable being tested is 132-kv 0.5 sq in. gas-filled submarine cable manufactured by British Insulated Callender's Cables, Ltd. Sketch of the cable appears at the right. The cable has a diameter of slightly more than 3½ in.

From the "Alert," anchored one-half mile off shore, the cable was floated ashore and then hauled by winch to the beach testing terminal.

English Channel, floated ashore . . .

to the testing site

Seek Experience . . . Purpose of the present series of tests is to gain experience in jointing and handling of the heavy cable. The cable weighs a pound an inch. Channel crossing is estimated at 26 miles, so a cable stretching the length of the channel would weigh about 735 tons. Manufacturers expect to be able to produce cable in 26-mile lengths.

Results of the current tests are expected to be available by the end of the year.

France expects to conduct sea trails on two to four sections of gas compression cable, each about 100 yards long. The cables will be laid off a jetty, in deep water, and jointed to form a loop.

The channel cable project (from Dover to Calais) developed by British Electricity Authority and Electricité de France comprises four cables to carry three-phase current at 132 kv. One cable would be set aside for emergency use and would also serve for experiments with direct current transmission. The channel circuit would be connected with the 132-kv British system and the French 90 and 225-kv systems.

Aim of the channel interconnection would be a more economic use of power in the two countries. At times when France had a surplus of hydroelectric power, this energy would be exported to Britain and at periods when it was necessary for France to conserve her water resources, Britain would export power to the Continent.

Cost of the project is estimated at about $12.6 million which would be shared equally by Britain and France.

Hells Canyon Hearings Recess

Proceedings off until Sept. 21 to allow FPC staff and opponents of 3-dam plan time to prepare for examining witnesses

Federal Power Commission hearings on the Idaho Power Co application to develop the Hells Canyon stretch of the Snake River are scheduled to reconvene Sept. 21 after a six weeks recess. Examiner William J. Costello granted the recess to allow the FPC staff and opponents of the application time to prepare for cross-examination of company witnesses.

As the first portion of the Washington hearings drew to a close, R. P. Parry, company attorney, said the "substantial" case for electric company development had been presented. He reserved the right, however, to introduce new testimony should the cross-examination require it. Most recent testimony for the company included that of financial witnesses who said Idaho Power would have little trouble raising money to pay for its proposed three-dam project.

Interior Witnesses . . . Following the cross-examination of Idaho Power witnesses FPC staff is to present several Interior Department experts who have had a hand in planning and designing a proposed federal high-dam development of the Hells Canyon site. Opponents of the Idaho Power application are slated to present their case to wind up the hearings, although at least one more recess may intervene before that time.

National Hells Canyon Association, which appears to be carrying the burden for the opponents, was still seeking a 90-day recess as the first round in the hearings concluded. Another attempt for an extended recess is expected following Interior and FPC staff testimony.

Idaho Power has vigorously opposed any extended delays in the series of hearings. Parry has argued that NHCA attorneys are well-informed on the issues involved in the high dam-low dams controversy and the hearing should proceed speedily.

At one point, Parry called C. Girard Davidson, chief attorney for NHCA "probably the man best equipped in the United States to cross-examine" power company witnesses. Davidson, however, has not regularly attended the hearings, and most of the day-to-day opposition has fallen on the shoulders of Mrs Evelyn Cooper, who also represents NHCA.

In concluding the Idaho power case, financial and engineering witnesses testified as to the feasibility of the three-dam private development.

Feasible and Possible . . . Stewart S. Hawes, vice president of Blyth & Co, a New York investment banking firm, said private financing of the $133-million development is "feasible and possible" under existing conditions and under conditions as they have existed during the past 15 years.

He noted that Idaho Power bonds are rated "AA" and the company's credit standing puts it in the top 10% of the industry.

Testifying on the short-term financing aspect of the company plan, S. T. Mason Frey, vice president of Bankers Trust Co said,

"I wouldn't have any doubt about the company's ability to obtain the short term financing set forth there."

Winding up engineering testimony, J. E. Moore, general consultant with Ebasco Services, Inc, called the Idaho Power plan superior to a high federal dam development.

"In the last analysis," Moore said, "all the high-head dam offers that the three dams do not is an incremental 2,880,000 acre ft of reservoir capacity, slow to fill and slow to refill if it is used.

"This incremental storage capacity is not needed at the site and is not so located as to be of much eventual benefit to the integrated chain of Columbia River power plants. As to help for power plants on the lower Snake, there are no power plants on the lower Snake. And this extra empty storage capacity would involve additional costs in the hundreds of millions of dollars, and expenditure of materials equipment and manpower which could be put to genuinely important use elsewhere in the Northwest's power system."

Proposed Dam on the Feather River

This is an artist's view of California's projected Oroville Dam, main feature of the proposed $1.2 billion Feather River project involving the storage of water near Oroville, production of power, and transportation of water over the Tehachapi Mountains into southern California. The dam would be located on the Feather River 5 miles upstream from Oroville. The California Division of Water Resources is now completing engineering studies. If found feasible for state construction, it plans to call for issue of bonds to finance the work.

Power Policy to Be Scrutinized

Newly appointed Hoover Commission is expected to look into the federal government's role in the electric field

Federal power policy is a prime target for investigation by the rejuvenated Hoover Commission slated to get down to serious work this fall.

Heavy role of the federal government in development and marketing of power falls clearly in the category of government functions which the commission is directed to study.

The law authorizing creation of the 12-man group, formally called "Commission on Organization of the Executive Branch of the Government," directs it to recommend means of:

- "Eliminating nonessential services, functions, and activities which compete with private enterprise."
- "Limiting expenditures to the lowest amount consistent with efficient performance of essential services, activities, and functions."
- "Eliminating duplication and overlapping of services, activities, and functions."

If there was any doubt that these injunctions apply to federal power policy, it has been dispelled by the makeup of new commission.

Former President Herbert Hoover, slated to head the group, is an outspoken critic of the present federal role in power development and marketing. In a widely quoted speech in April, he urged the U. S. to "get out of the business of generating and distributing power."

At the same time, he outlined a program for reaching this objective. Among other things, he suggested Congress should create a commission to reorganize the whole federal power venture. The new commission, already bearing his name, appears to fill the bill.

Several other members of the commission share Hoover's interest in federal power policy although their detailed views are less well-known.

Sidney A. Mitchell, New York banker, has had ample opportunity to acquire a broad experience in the electric utility field as a director of American Gas & Electric Co and through his connections with International General Electric Co.

Several legislators on the new commission have accumulated considerable background on federal power activities, and with one or two exceptions have been mainly critical. Rep Clarence Brown, (R., Ohio) has been a sharp critic of Tennessee Valley Authority as well as other federal ventures in electric power. Sen Homer Ferguson (R., Mich.) largely shares the views of Hoover and Brown.

To a lesser extent Sen John L. McClellan (D., Ark.) is to be found in this camp, although he has vigorously backed federal waterway and power development by the Army Corps of Engineers.

Rep Chet Holifield (D., Calif.) is the lone, loud exponent of public power on the 12-man commission.

Less is known of the power views of the others on the commission. They are: James A. Farley, former chairman of the Democratic National Committee; Herbert A. Brownell, U. S. Attorney General; Arthur S. Fleming, director of Office of Defense Mobilization; Solomon Hollister, dean of Cornell University School of Engineering; Robert Storey, president of American Bar Association and dean of Southern Methodist University Law School; and Joseph P. Kennedy, former ambassador to Britain.

President Eisenhower has called initial meeting of the new group for Sept. 29. At that time members are expected to select Hoover as chairman and discuss an agenda.

Soviet Power Official Leaves Users in Dark

Fulfilling the quota for municipal electric repair work in Russia can be just as dangerous as failure to carry out the assigned plan.

Chief of Kiev electric distributions system and head of Kiev electric repair department have been held up to public ridicule by "Izvestia," government newspaper, because of their inflexible determination to meet their work quota exactly.

As "Izvestia" reported it, an electric pole on Kiev's New 660th Street fell down, cutting off power to homes in the area. When residents complained, the electric service directors refused to make repairs on grounds that the Kiev electric system had fulfilled its monthly quota of repair work and restoring service on New 660th Street would mean exceeding the quota.

The city council, public organizations, the local Communist party committee, and the editors of Kiev newspapers joined the residents of New 660th Street in their protest.

On the 11th day a new pole was erected and wires were repaired—by residents of New 660th Street.

New Approach . . .

. . . followed by REA to end squabble between Kentucky co-ops and power companies

New Republican-led Rural Electrification Administration is trying a new approach to solving the bitter controversy which has plagued eastern Kentucky cooperatives and electric companies for nearly three years.

At a recent conference with REA Administrator Ancher Nelsen, representatives of both sides agreed to cooperate with an independent consulting engineer in reviewing the power problem in the state.

Conferees Tight-Lipped . . . Representatives at the conference declined to discuss the issues immediately at stake, but these include the effort of the East Kentucky Rural Electric Cooperative Corp to build a huge transmission network and additional generating facilities to serve distribution co-ops in 62 east Kentucky counties.

Kentucky Public Service Commission recently approved one application for transmission construction by the generating and transmission cooperative, but has not yet ruled on another application for additional lines and generating capacity (EW, July 6, p. 35).

In the brief statement issued following the conference with Nelsen, the company and co-op representatives said:

"It was agreed that the interests of the rural people of Kentucky are paramount to other considerations involved in the dispute, and that every reasonable effort should be made to meet the need for proper distribution of power."

THE ELECTRICAL WEEK

CONTINUED

Southeastern Power Administration sells its partially completed 115-kv Clark Hill-Greenwood (S. C.) transmission line to Greenwood County Electric Power Commission for $326,000 . . . Interior Secretary McKay orders a survey of Reclamation Bureau in an effort to streamline operations. Survey team is to report by Oct. 1.

At a Jefferson-Jackson Day banquet in Seattle recently, Michigan's Gov G. Mennen Williams said the Republican administration is trying "to dim out and slow down the mighty forces of public power." He added, "We Democrats hold it is proper business of government to develop people's natural resources, when that development cannot be done as well, or cannot be done at all, by private means." Private utilities should be "encouraged wherever they can do the job," he said, declaring Democratic Party is not opposed to such operations.

Robert W. Jennings, area engineer for Reclamation Bureau at Grand Junction, Colo., is named Alaskan district manager for bureau. Major construction project in Alaska is Eklutna hydro project . . . AEC power reactor construction for this fiscal year will be limited to starting a single pressurized water reactor which shows little promise of industrial power production. This reactor reportedly will have a useful power capacity of around 60,000 kw at an estimated cost of as much as, or more than, $500 per kw. On industrial front, Commonwealth Edison and possibly one associated utility are rumored to be seeking AEC permission for detailed engineering and architectural designing of a nuclear power plant.

IN THE INDUSTRY

One glance at the weekly output chart on page 3 is enough to convince anyone that the industry is expanding. This year's curve has been running 10 to 20% above that of 1952. In the week ended Aug. 1, output reached a record high of 8,511,622,000 kwhr.

To make possible this record production of electric energy, the industry first had to make records in customers, capacity, and money invested. But after all the industry is only the sum of the many companies comprising it. The industry's expansion has actually been their expansion. And all companies have been expanding though because of local conditions at varying rates.

Bursting Out All Over . . . In certain areas such as the Southeast, the Southwest, and the Far West where population and industry have been soaring since 1940 some companies, figuratively speaking, have been bursting out all over. One such company is the Southwestern Public Service Co, Amarillo, Texas. This company serves the north central region of Texas and small areas of New Mexico, Oklahoma, and Kansas. Recently company officials brought its expansion to the attention of the New York Society of Security Analysts. Here are some of the high points:

- Population of the 15 principal communities served increased 76% from 1940 to 1950 while the nation grew but 15%.
- Electric customers served more than doubled while gross operating revenues increased about 250%.
- The dividend rate has been increased ten times in the last ten years—on an adjusted basis from 13¢ to $1.12 a common share.
- A $500 investment in SPS common in September 1942, when first offered to the public, is worth over $6,000 today. In addition interim dividends have been over $2,500.

Additional Details of Company's Growth . . . For the analysts these were important bits of information, but a study of company records for the ten fiscal years, Sept. 1, 1943 to Aug. 31, 1952, provides these additional details.

Total operating revenue rose from $8,483,000 to $25,416,000, net income from $2,607,000 to $5,490,000, and balance for common stock from $2,220,000 to $5,069,000.

To do this amount of business the company increased its plant account from $37,119,000 to $137,655,000. This is emphasized by capability growth from 112,100 to 404,500 kw. At present the newest plant has more installed capability than the entire system in 1943.

The rapid growth of this company (H. L. Nichols, chairman, and J. E. Cunningham, president) merely dramatizes and makes more vivid the expansion of an industry all of whose companies are expanding to serve the loads of tomorrow as well as the loads of today.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Reheat has now been justified for several gas-burning power plants despite a fuel cost per million Btu less than half the former "critical" value of 20 to 25 cents.

Large conductors are unlikely to vibrate at tensions below 8% of their ultimate strength. At tensions of 15% or more the deflection at the clamp is substantially constant. Span length is a minor factor.

Distribution lightning arresters can be tested by 2 men at the rate of 30 in 8 hours with average labor cost of 80 cents apiece. Rejections were about 9% on electrical grounds and 6% on mechanical.

Suspension of circuit breakers from substation structure may alleviate some of the mounting and column strength factors for the new bracket of high voltages.

Covering grounded objects (e.g. telephone messenger) may occasionally be as necessary as covering the energized power wires.

Network faults involving a single cable may, however, involve 25 to 30 protectors. Inference is that they should be backed up with fuses because one of this number of protectors could be expected to fail every third fault.

Increased loading of transformers has naturally raised the top-oil temperatures and thus may have shortened the oil life to ⅔ or even ½ unless sludging was prevented by excluding oxygen.

No job too big for ELLIOTT approved service shops

Soldering and taping final connections in the big generator stator.

Close-up of service men inside the stator inserting wedges and lashing coils.

The 12,000-kva generator installation.

REWINDING 12,000-KVA VERTICAL WATERWHEEL GENERATOR

● Using factory-built coils and factory methods, service men of Larsen-Hogue Electric Company, Los Angeles, handle this big generator job with no difficulty.

The Larsen-Hogue Company is one of many carefully selected shops, strategically located throughout the United States, to service all types of electrical equipment built by Elliott Company. Together they comprise a trained and dependable service organization which stands back of every Elliott motor and generator. In addition to these Approved Service Shops, is the staff of Elliott factory-trained Service Engineers, and the repair facilities which are available at the factory for regular or special service.

For the location of the Elliott Approved Service Shop capable of handling *your* service job — no matter what its size — contact your nearest Elliott District Office or write Elliott Company, Ridgway Division, Ridgway, Pa.; or Elliott Company, Crocker-Wheeler Division, Ampere, N. J.

R2-26

ELLIOTT Company

RIDGWAY DIVISION
CROCKER-WHEELER DIVISION

"Modern" means

UP-TO-DATE TRANSFORMER DESIGN ENDS CORONA DANGER FOREVER

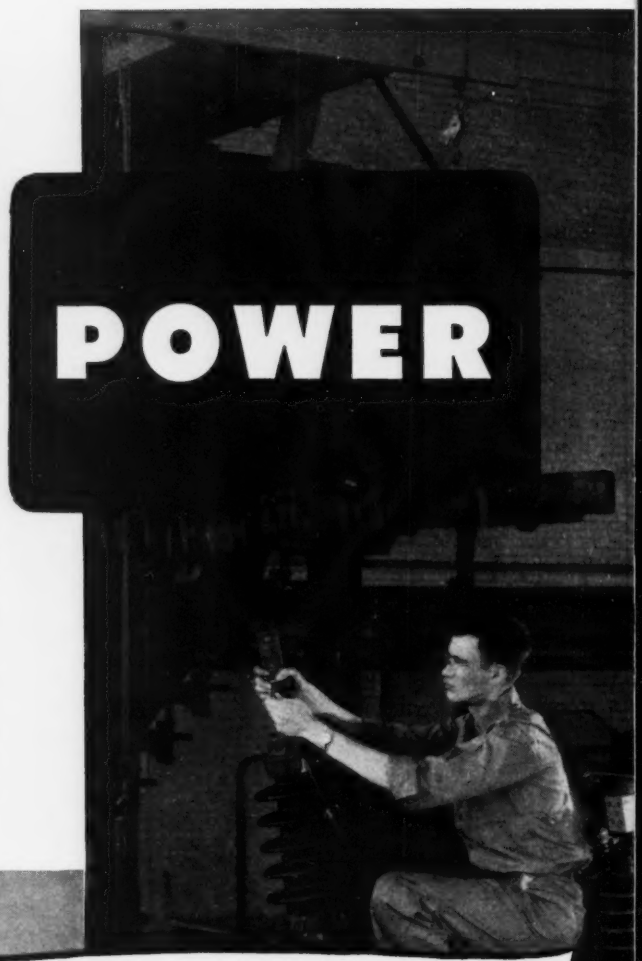
You no longer need worry about damage to power transformer insulation caused by creeping effects of corona. Your transformer investment will be completely protected when you specify a unit with corona-free design.

Testing Offers Proof

Testing methods now available provide positive assurance against even the smallest amount of corona. For example, transformers tested in Allis-Chalmers laboratories have gone through as many as 200 impulse shots. Result: inspection proved they were in just as good condition after the 200th shot as before the first.

Accurate manufacture, exhaustive tests, and field performance are proving your transformers will continue to pay off many years after the corona-free seal has been placed on them at the factory.

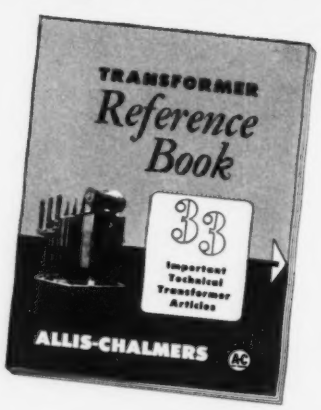
A-4123



Get Important Transformer Information

Here's a convenient source for answers to transformer questions. Allis-Chalmers "Transformer Reference Book," just published, brings you 168 pages of information based on more than fifty years' experience designing and building transformers. It explains transformer theory, gives some of the "whys" behind transformer design, and tells important facts about transformer operation.

The 33 articles in this book were originally published in Allis-Chalmers "Electrical Review." Now they've been brought up to date with new material where necessary. To get your copy, send one dollar to Allis-Chalmers, Milwaukee 1, Wisconsin. Or call your nearby A-C district office and ask for a free, four-page brochure that tells all about this handy, informative book.



Corona-Free!

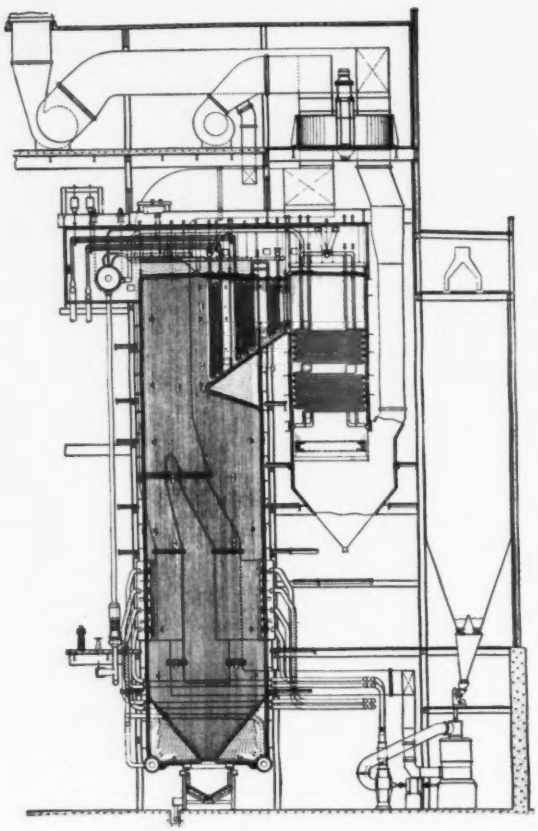
ALLIS-CHALMERS

A-C
ALLIS-CHALMERS

RIVERBEND STEAM STATION

Duke Power Company

C-E controlled circulation boilers



The C-E Unit shown above is one of two duplicates now in process of fabrication for the Riverbend Steam Station, Mt. Holly, N. C., of the Duke Power Company.

Each of these units is designed to serve a 135,000 kw turbine-generator operating at a throttle pressure of 1800 psi with a primary steam temperature of 1000 F, reheated to 1000 F.

These units are of the controlled-circulation, radiant type with a reheater section located between the primary and secondary superheater surfaces. An economizer section follows the rear superheater section and regenerative type air heaters follow the economizer surface.

Pulverized coal firing is employed, using bowl mills and tilting, tangential burners.

B-686

C-E

COMBUSTION ENGINEERING, *Inc.*

Combustion Engineering Building
200 Madison Avenue, New York 16, N. Y.

ALL TYPES OF BOILERS, FURNACES, PULVERIZED FUEL SYSTEMS AND STOKERS; ALSO SUPERHEATERS, ECONOMIZERS AND AIR HEATERS

Yukon Power

Canadian metallurgical firm to build 25,000-hp pilot plant and smelter on Taku River

First stage of the big Yukon River power and metallurgical development is likely to be the erection of a 25,000-hp power plant and accompanying smelter on the Taku River, according to officials of Quebec Metallurgical Industries Ltd.

The proposed plant is being planned as an economic operation in itself, independent of the larger scheme which Quebec Metallurgical Industries is developing for its parent companies, Frobisher Ltd and Ventures Ltd and which calls for eventual utilization of 5 million hp (EW, June 22, p 34).

The Taku plant is intended to serve as a pilot operation to demonstrate the feasibility of processing metals in the far north with the cheap power that is available there. The plant will be completed by the fall of 1955 and is expected to produce about 25,000 tons of ferro-alloys a year.

The Taku River is one of the two possible sites of the major development which involves damming the Yukon River which now flows northwesterly into the Arctic Ocean over a high plateau, creating a large reservoir, and diverting the water down the steep slopes of the plateau into the Pacific. The other site under active consideration is the Alsek River farther north.

Surveys Being Made . . . This summer the metallurgical company has six survey parties working. From the information collected by this investigation the company expects to decide the best location for the major project, having regard to ocean transportation, accessibility of nearby ore-producing or prospective areas, head of water, rock formations for dams and other construction, and level space for the metallurgical plants and a townsite.

When its plans respecting a site are settled, it is hoped, some time this winter, the company will apply to the federal government and the government of British Columbia for permission to divert and use the water. Organization of a new company to handle the operation, which would involve a capital investment of some $500 million, would follow the grant of the permit and, barring hitches, the summer of 1958 might see the completion of generating units of 100,000 hp. Additional generating units would be installed as the business developed.

Paper Work for St. Lawrence Project

Officials of Ontario Hydro-Electric Commission and New York State Power Authority looked over maps of the St. Lawrence River area in New York City this month as they met for preliminary discussions in connection with a power project on the river. The power authority recently was authorized by Federal Power Commission to construct U. S. portion of the project.

Attending the meeting were (left to right) Frank K. Leerburger, New York consulting engineer; Robert H. Saunders, chairman of Ontario Hydro; Dr Otto Holden, assistant general manager of engineering for Ontario Hydro; and John Burton, Chairman of New York State Power Authority.

POWER BRIEFS

• First of two 125,000-kw generating units at Southern California Edison Co's $40-million Etiwanda steam plant went on the line last month. Second unit is expected to be in operation about Oct. 1. Plant is located in San Bernardino County.

• Interstate Power Co and Northern States Power Co plan two major interconnections of 161-kv lines for 1954 and 1955. The first would be made at Beaver Creek, Minn., after the two utilities build a line from Sioux Falls, S. D., to Heron Lake, Minn., where it would connect with an existing Interstate line. The second interconnection would be made at Winnebago, Minn., after Interstate builds a 161-kv line from its Fox Lake plant to Winnebago and then to Albert Lea, Minn. Northern States will build from Mankato to Winnebago. The interconnections will link plants at Mankato, Albert Lea, Fox Lake, and Sioux Falls.

• North of Scotland Hydro-Electric Board has received authorization to construct the $24,640,000 Loch Shin project in Sutherland. The project covers a catchment area of more than 250 sq miles and will develop water power resources of Loch Shin, its tributary streams, the river Cassley, and the upper part of the river Brora. Four dams will be built, and five generating stations with a total capacity of 40,000 kw.

With new Administrator Ancher Nelsen pulling the string . . .

Co-op Marks Site of First REA Pole

Pioneer Rural Electric Cooperative commemorates 1935 event during "Co-op Power Week" in Ohio

"Piqua today was the scene of an epochal event, the start of construction of a rural electrification project on a cooperative basis that is destined to become a nation-wide program."

The Piqua (Ohio) Daily Call printed these prophetic words almost 18 years ago, in its issue of Nov. 14, 1935. The occasion was the setting of the first pole by a Rural Electrification Administration-financed electric cooperative.

Last month that event was commemorated at special ceremonies near a substation operated by Pioneer Rural Electric Cooperative, Inc, on the outskirts of Piqua. There, REA Administrator Ancher Nelsen, first one under a Republican Administration, unveiled a plaque marking the site of the historic pole and stated in summary of the REA program:

"I think we have been a party to one of the most wholesome, productive, and enlightened things that has ever been done in this country."

Festive Occasion . . . The ceremony was one part of "Co-op Power Week" proclaimed by Gov Frank J. Lausche for the week of July 26, and was held in conjunction with the celebration of Ohio's 150th year as a state.

The day-long festivities opened with a tour by co-op members and friends of the Piqua Municipal Power System, supplier of two-thirds of Pioneer's electricity. It was followed by the unveiling ceremonies, a parade from the dedication site to the town park, a family picnic.

An evening program featured another address by Nelson and a contest to determine "Miss Pioneer Co-op Power" from among 34 candidates.

Sticks to the Book . . . Nelsen told his audience of 5,000 that as far as the REA program is concerned, it will be exactly like the one conducted previously by the Democratic Administration "within the mandates of the law."

He warned that co-op borrowers have an obligation to the federal government to see that loans are carefully husbanded so that the country will get back the money that it loaned.

Nelsen said the biggest problem is to preserve the economic stability of the country.

"We cannot forever ask of our government that they do for us what we can do better for ourselves," he added, in line with policy statements of the Eisenhower Administration.

PARADE featured 100 motorized units and floats, including this one on which the 34 beauty contestants rode, after which . . .

PAT FAVORITE of Miami County was chosen "Miss Pioneer Co-Op Power," with Stephany Jo Foster (left) placing second

Many Returnees . . . Among the several thousands who participated in the proceedings during the civic half holiday were many of the people who took part in the 1935 ceremonies. These were held 10 days after REA had made Loan 1-A of $254,000 to build 188 miles of line to serve 690 rural consumers in Miami County.

At the time, the organization was known as Miami County Rural Electric Co-op, Inc. However, by the time the first meter was set on June 15, 1936, it had merged with Shelby County Rural Electric Co-op, Inc, and Champaign Rural Electric Co-operative, Inc, to form the present cooperative.

Rapid Growth . . . Today the Pioneer Rural Electric Co-operative, managed since 1937 by A. E. Halterman, serves 5,800 rural consumers in 11 counties who use an average of 4,200 kwhr per year.

Fifteen years ago its 3,312 members used an average of 560 kwhr annually. Over the same stretch average December bill per member has jumped from $2.85 to $11.57, while rates have been coming down.

Its 1,505 miles of line are fed by five co-op-owned substations with a total capacity of 8,500 kva, which contrasts with 900 kva in 1936. In addition, it receives one-third of its energy from Dayton Power & Light Co at three metering points.

DAY-LONG program opened with tour by members and friends of Piqua Municipal plant, which supplies two-thirds of co-op's power

PROMOTIONAL AIDS used during observation of Michigan's Electrical Week last May are studied by (l to r) J. R. Dooley, Electrical Service League of British Columbia; Ralph Hubbard, IAEL president; and J. G. Waddell, Electric Institute of Boston, at IAEL's recent conference

Aggressive Promotion Needed

. . . to sell wares of electric industry, Hubbard tells meeting of International Association of Electrical Leagues

Cooperative effort and aggressive promotion were keynotes of an address given by Ralph Hubbard, president, International Association of Electric Leagues, at the group's 18th annual conference in San Francisco, Aug. 5-8.

In planning ahead, said Hubbard, the electric industry can look for great competition in getting its rightful share of the customer dollar. There is great need for aggressive promotion of selling programs in all branches of the electrical industry. Success of these programs depends on results at the local level. Therefore, selling is the key word today, he told the group.

Bright Power Outlook . . . Outlook in power supply and appliance sales potentials are equally bright for the next ten years, said George C. Tenney, president of McGraw-Hill Co of California, San Francisco. From a level of about 82 million kw at the end of 1952, capacity will climb to about 192 million kw by 1963, he said. And, he estimated, generation will rise about 500 billion kwhr to about 878 billion kwhr in 1963, with reserve capacity estimated at 22%.

Average annual residential use will be about 3,842 kwhr in 1960, compared with 2,175 in 1952, Tenney declared. He detailed a survey of future appliance sales (EW, May 18, 1953) which indicates an annual market of close to $7¼ billion from 1953 through 1960. However, he added, sales efforts will have to be greater than ever before if estimated sales potentials are to be realized.

Home Lighting . . . In coming down the stretch to the centennial of light, remarked W. H. Robinson, Jr, advertising and promotion manager, Lamp Division, General Electric Co, Cleveland, promotion should be directed toward home lighting. As proof of the need for this promotion, he said a recent GE survey indicated that at the present rate of improvement it would take over 100 years to reach standards in residential lighting now prevailing in many stores and offices.

Sheer size of the home lighting market plus the fact that no saturation point is apparent spell high profits for the manufacturer and sellers of lighting equipment. For the utility company, profitable revenues are indicated by the fact that lighting accounts for slightly more than 40% of total residential usage. This figure was reported recently by A. C. Nielsen Co, an independent research group, Robinson added.

To capture some of this potential market, a new idea in portable lamp merchandising—the Lamp Fashion Festival—will highlight a large-scale lamp promotion program. Promotion will begin this fall and continue through 1954, "Light's Diamond Jubilee" year. Co-sponsored by Lamp and Shade Institute of America, General Electric's Lamp Division and electric companies, the festival will consist of consumer shows, where "roomfuls" and "housefuls" of lamps will be displayed and offered in coordinated packages.

New TV Horizons . . . New horizons in the television industry were previewed by Robert S. Bell, executive vice president, Packard-Bell Co, Los Angeles. With 250 stations in service as of Aug. 1, Bell estimated that 500 to 600 more might be added within the next 18 months. This will place 90% of the population within a satisfactory signal area.

Currently, 46% of all wired homes are without receivers. This potential market plus replacements can account for total sales of over 40 million sets by 1955, he added. Furthermore, Bell estimated a replacement market of about 7 million sets annually by that time. On the question of color television, he remarked there still remain several "stumbling blocks" so that this development is not yet right around the corner.

First Electric Housewares Industry Plaque award was made to the Electrical Association of Philadelphia for the most thorough and comprehensive job of implementing the national Electric Housewares Gift Campaign at the local level. Receiving the award for his group was John Morrison, executive director.

IAEL members elected as their president for the coming year Albert L. Maillard, president of Electric League of Indianapolis.

HOT-LINE TOOLS

and SAFETY ACCESSORIES

...via GraybaR

Your linemen are only as safe as their equipment—lives depend on its quality.

So, for sure, certain all-over protection order hot-line and safety needs from your near-by Graybar office. Made by well-known, highly-regarded manufacturers, they're all products your linemen respect... work with in confidence.

Chance hot-line tools — Graybar can supply Chance hot-line maintenance tools individually or in sets. Incorporating the latest developments in equipment for handling energized lines, Chance tools are tested to withstand 75,000 volts per foot. Metal fittings are lightweight, heat-treated aluminum alloy... poles are laminated Sitka Spruce. There's a specialized Chance tool designed to do every hot-line job safely and efficiently.

Salisbury Rubber safety accessories — Graybar distributes Salisbury protective devices of all types — rubber line hose and insulator hoods . . . rubber blankets and jackets . . . rubber coats, gloves, and sleeves. All are top-quality fully-guaranteed products made of purest crude rubber.

Call Graybar for all of your other pole-line needs as well. You can rely on your local Graybar Representative to provide complete, accurate information on anything you require. For special help on out-of-the ordinary problems, feel free to ask for the assistance of a Graybar Outside Construction Specialist. *Graybar Electric Co., Inc. Executive Offices: Graybar Building, 420 Lexington Avenue, New York 17, N. Y.*

347-98

Call Graybar first for...

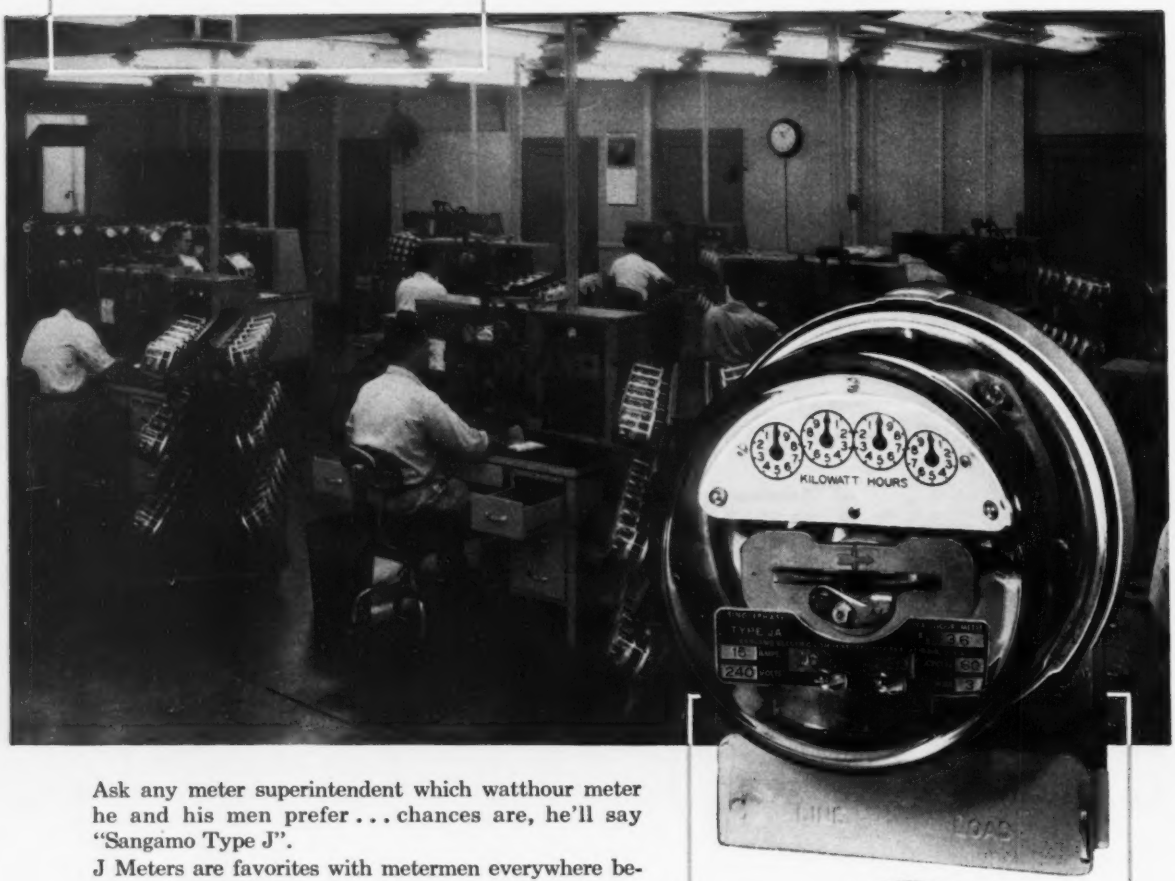
GraybaR Everything Electrical GraybaR ELECTRIC COMPANY

SINCE 1869 * REG. U.S. PAT. OFF.

IN OVER 100 PRINCIPAL CITIES

a full measure of acceptance

Sangamo J Meters



Ask any meter superintendent which watthour meter he and his men prefer . . . chances are, he'll say "Sangamo Type J".

J Meters are favorites with metermen everywhere because they are easy to calibrate and they *stay* in calibration! They do facilitate the maintenance and testing program of the meter department—and they are known for extremely long troublefree service.

Sangamo J Meters are built to provide the unchanged accuracy necessary to measure all the electricity delivered over a period of many years. Careful attention to those qualities necessary for accurate measurement with minimum maintenance has always guided the design and manufacture of Sangamo Meters.

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

Only Measured Facts are Known Facts

JM53-6

Serving Co-ops . . .

. . . under a new plan are Northern States, which supplies power, and Otter Tail, which wheels it

Five cooperatives are receiving power from Northern States Power Co over lines of Otter Tail Power Co as a result of a plan worked out by the two private power companies. Under the new arrangement, the co-ops become the customers of Northern States. Previously they had been receiving most of their power from Otter Tail.

The new power contracts with the co-ops became effective Aug. 1 with the energizing of a 115-kv line from Canby to Granite Falls, built by Otter Tail, interconnecting the systems of the two private utilities.

Co-ops Involved . . . The co-ops are Lake Region Cooperative Electric Association, Lyon-Lincoln Electric Cooperative, Runestone Electric Association, Traverse Electric Cooperative, and Minnesota Valley Cooperative Light and Power Association.

It is estimated the new contracts make available to the co-ops savings of $200,000 a year.

This interconnection and transfer of power supply is also the result of agreements reached by a committee of representatives of the power companies and 20 co-ops in southern and western Minnesota, numbering among them the five named above. The contracts permit the co-ops to receive Missouri River power when such power becomes available in this area. The power companies also agree to wheel such hydro power to the co-operatives.

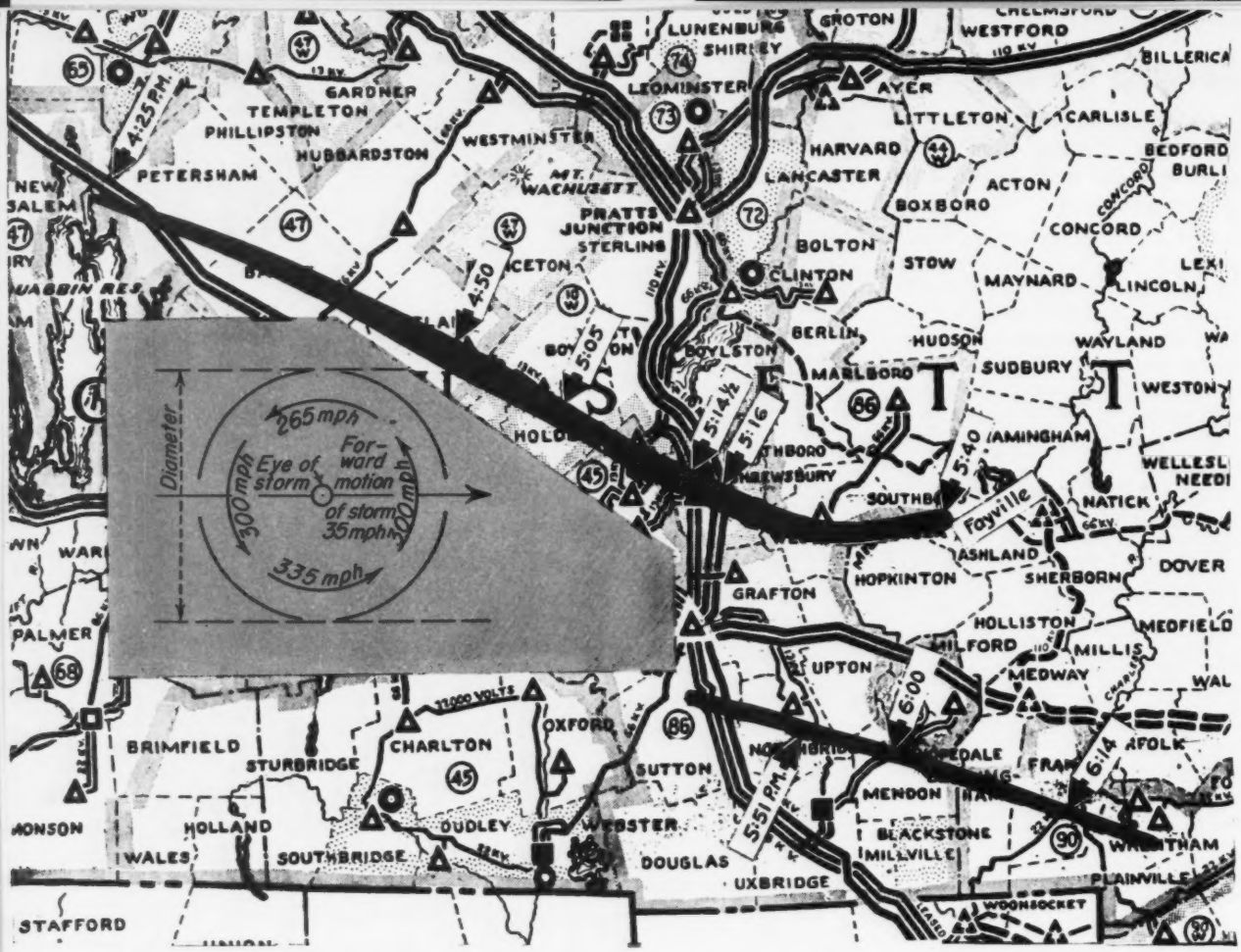
Heavy Load . . . Until the early part of 1952 Otter Tail supplied energy wholesale to 23 co-ops, including the five mentioned above, in its territory in Minnesota, North Dakota, and South Dakota. At that time sales to co-ops accounted for 26% of the company's system load. At the present rate of growth it is estimated that by 1954 this power consumption would have been nearly 40% of Otter Tail's entire system load. If the company were to add to its generating capacity to continue serving these co-ops on short-term contracts and then, in the next few years the co-ops received power from federal projects, it would leave Otter Tail with a high excess of generating capacity.

To avoid this situation and still provide adequate service for the co-operatives, Otter Tail worked out a plan with eight North Dakota co-ops and Bureau of Reclamation which went into effect in April 1952. The present plan follows a somewhat similar pattern with Otter Tail and Northern States working out the tie between the two systems.

Throwing Switch at Co-op Substation

Workman Angeles Tapparo throws the switch that activates a new substation built by Intermountain Rural Electric Association near Strasburg, Colo. The station and a 44-kv transmission line, built jointly by the co-op and Public Service Co of Colorado, permit an interconnection between the two systems. Witnessing the event are (left to right) John E. Loiseau, president of Public Service; Gilman Daggett, Public Service; and C. M. Hamilton and R. A. Miller, president and vice president of Intermountain.

Intermountain gets power from the government's Colorado-Big Thompson project and the intertie with Public Service will provide the co-op with standby steam power. Public Service built the portion of the transmission line from Denver to Watkins Glen and the co-op continued it to the substation.



FORTY MILE PATH of storm across Worcester County, Mass., varied in width from 100 yards to as much as half mile near Worcester

Tower Damage Provides Key to Worcester Tornado Data

Wind velocities and pressures on fallen New England Power Service towers are deduced from known figures on factory test to failure

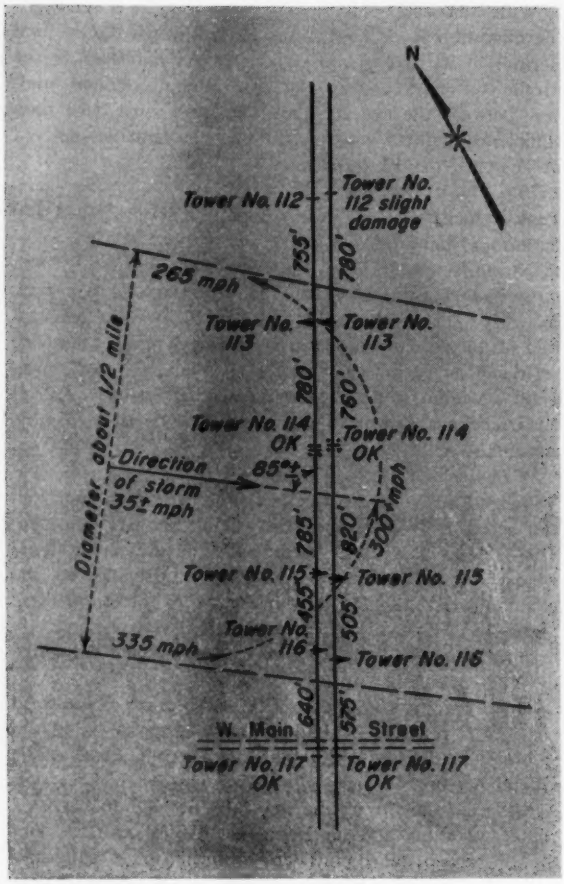
CLYDE A. BOOKER, Transmission Line Engineer, New England Power Service Co, Boston, Mass.

When cyclonic storms cut a devastating swath across Worcester County, Mass., on June 9, details of their destructive paths were clearly recorded by blown down transmission line towers.

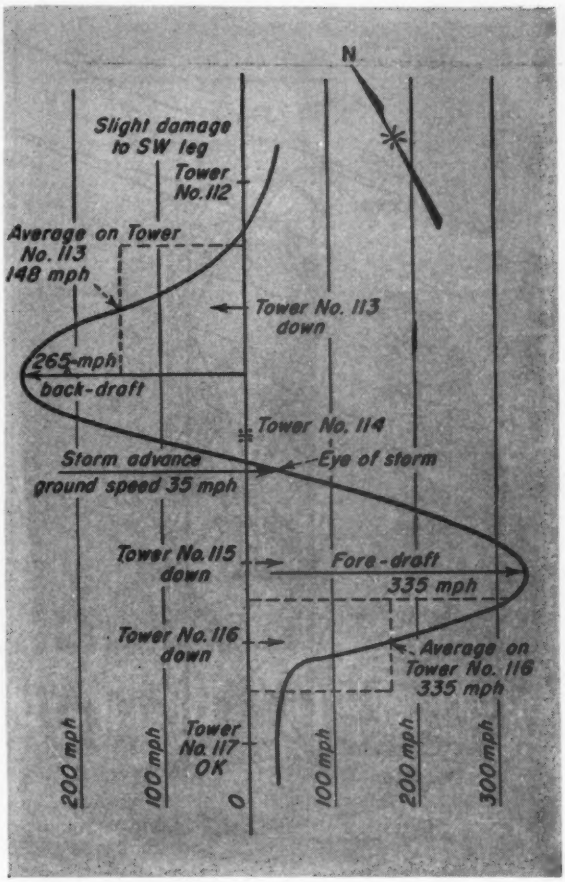
The main storm crossed two important rights-of-way of New England Power Co near the northern end of Lake Quinsigamond between Worcester and Shrewsbury. Six A-frame towers were destroyed on the Worcester-Quinsigamond spur 69-kv line running from Greendale to Millbury substation.

About 0.6 miles to the east on a parallel north and south right-of-way, three towers were blown down on each of two single circuit 115-kv lines from Pratts Junction to Millbury. One tower on each of these lines was left standing near the eye of the storm.

How these towers were affected seems to be one of the few keys to the peripheral wind velocities generated by the storms. Fortunately, a full size factory test to failure was made on this particular design of 115-kv tower. The test results afford a basis for the belief that the probable minimum and maximum velocities attained in this storm were 300 and 375 mph.



STORM'S APPROACH is plotted relative to New England Power Service 115 KV lines. Arrows show direction in which towers fell.



PEAK VELOCITY of 265 miles per hour appeared on backdraft side of storm. On foredraft side, peak velocity hit 335 miles per hour.

Wake of the Storm . . . The path of the storm is shown on the map. According to the time data charting the progress of the storm, it advanced at a rate close to 35 mph. Twenty minutes after the main storm had passed, a second and less intense storm developed ten miles to the south on roughly a parallel route.

The relative direction of the storm's approach to the 115-kv lines is shown above. Tower No. 113 blew down toward the west while the southwest legs of Tower No. 112 suffered slight damage. Tower No. 114 was not structurally damaged, although the condition of some of the bolts and braces indicated that this tower was under heavy stress. Towers No. 115 and 116 were blown down to the east.

Apparently, the approach of the storm was at an angle which brought the backdraft into effect on Tower No. 113 before the foredraft could effect No. 115 and 116. At the moment that these effects occurred, the storm was apparently moving forward at a velocity of the order of about 50 fps.

Operating records show that the easterly or leeward line failed 39 cycles before the westerly line. Severe conductor burns, which could have occurred only when the energized line was grounded, indicate that the easterly line failed at Tower No. 113. Similar indications lead to the deduction that the first tower to fail on the westerly line was No. 115.

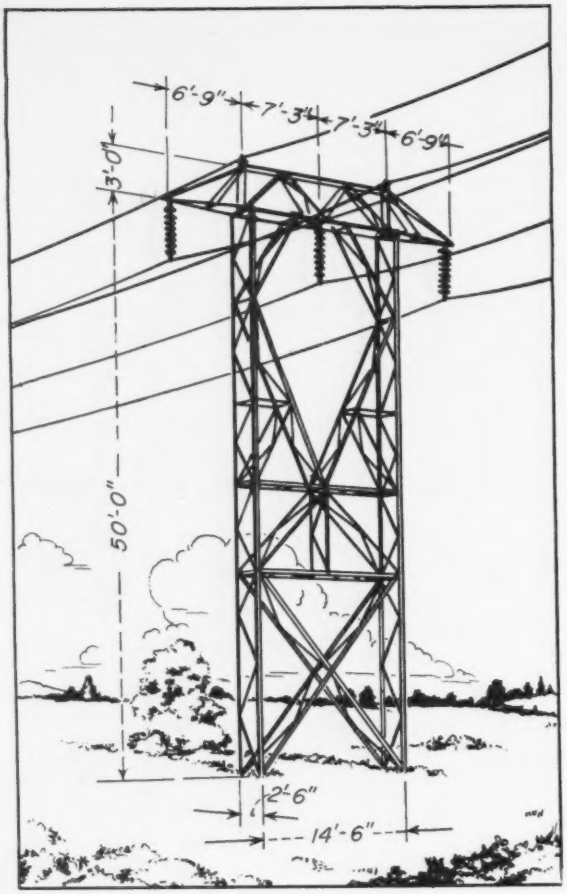
Towers No. 113, 115, and 116 were semi-flexible structures described in the author's Electrical World article of Sept. 16, 1928. At that time, the towers failed under factory test at a transverse load equivalent to 14,050 lb applied at the crossarm, with a suitable allowance made for the vertical loads present during a tornado.

Calculating Wind Velocities . . . The minimum probable average wind velocity at Tower 113 can be computed from known figures:

The conductor is 477,000 ACSR and the ground wire is 7/16 in. diameter steel. The projected area of the conductors and ground wires is taken for one-half the sum of the adjacent spans. These spans are 1,535 ft. Half of this distance is 767.5 ft, giving 224 sq ft of projected area when adjusted to crossarm height.

To this figure is added the 32 sq ft flat tower area. It is increased by about 50% for the leeward face or angular direction of wind, then adjusted for crossarm height and converted to the larger equivalent cylindrical area for direct addition. The result is equivalent to 32.5 sq ft of wire at crossarm height.

The total equivalent projected wire area at crossarm



TOWER STRUCTURES were semi-flexible. Full factory test to failure provided working figures for computing causes of damage.

height is therefore 256.5 sq ft. When this figure is divided into the 14,050 lb transverse capacity of the tower, it shows that 54.6 lb per sq ft is necessary to cause mechanical failure.

A pressure of this magnitude on small cylindrical surfaces converts to 148 mph average velocity at Tower No. 113 on the backdraft side of the storm. Similar computations made for Tower No. 116 show an average velocity of 170 mph on the foredraft side of the advancing storm.

Both of these computations give the average minimum velocity which could cause the two towers to fail. Inspection after their failure showed that the footings and all other features of the towers were in perfect condition before the storm struck.

Eye of the Storm . . . Tree damage adjacent to the right of way indicated that the storm path there was approximately one-half mile wide. The track of the eye was a little to the north of the center of the damaged area or a little to the south of Tower No. 114, which did not fail. Assumedly, there was no peripheral velocity at the eye of the storm. At the outer edges, the velocity probably did not exceed those experienced frequently and normally —about 50 mph.

With such data, it is possible to rationalize a profile of the minimum ground velocities taken through the eye and normal to its direction of advance. As indicated in the profile on a preceding page, peripheral velocity midway between the eye and the outer edge must have been sufficiently high to generate the average velocities derived at Towers No. 113 and 116.

Peak Velocities . . . A peak velocity of about 260 to 270 mph must have been attained on the backdraft side of the storm to wreck Tower No. 113. About 330 to 340 mph must have been attained on the foredraft side to wreck No. 116. These figures agree with the well established rate of advance of the storm at about 35 mph. They also set the peak peripheral velocity at about 300 mph minimum. Minimum peak ground velocities of the several quadrants are shown in the opening illustration of this article.

Velocity Limits . . . Tower No. 114, which did not fail, can be used to define a velocity which was not exceeded. These particular towers were affected by longitudinal winds, not by transverse currents which affected the other towers. With No. 114 at the eye of the storm these towers were not affected by the forward velocity but only by the peripheral velocity both preceding and following the eye.

The total projected area of the face of a tower at No. 114 is 118.8 sq ft. Its longitudinal capacity is 42,000 lb breast load based on 20,000 lb psi tensile stress in the critical bracing.

Although the towers did not fail, the slightly distorted condition of the bolts and diagonal braces indicated that they had been under considerable strain. The bolts indicated that this strain was probably equal to the design loading, making the wind pressure 376 psf. Such a pressure on a flat area corresponds to a velocity of 343 mph.

The critical tension brace at failure would have sustained a load of about 1.9 times the design load. This load would be equivalent to 715 psf, or 472 mph. However, no load approaching the ultimate capacity could have been applied to these towers by the storm. They were found to be in excellent condition.

Elastic Limit a Clue . . . None of the conductors or ground wires suffered any injury except for abrasion. They simply required repair sleeves or their equivalent. Then they were reinstalled on the replacement towers without any necessity for resagging. Apparently none of the phase or ground conductors was stretched beyond its elastic limit.

The actual conductor was 477,000 ACSR sagged 29.2 ft for a 785-ft span of 60 F. This sag would have increased to 40.75 ft if the conductor had been stretched to its elastic limit by a uniformly applied load.

With 13,100 lb as the elastic limit of the wire, a load of 6.9 lb per lineal foot would be necessary to generate an equal tension. Such a load figure, divided by the projected area of the wire, results in pressure of 96.5 psf or a velocity of 196 mph. Rounding out the data obtained from the calculations of tower damage, it is probable that the peripheral velocity attained in this particular storm was approximately 350 mph. The towers thus experienced pressures of 300 psf on cylindrical surfaces and 400 psf on flat surfaces.

Flying Farmer unit showing stake-mounted socket and lamp

Flying Farmer unit is easily assembled. You just drive the stake into the ground, fit on the lamp and socket, and turn the lens and cone assembly 90 degrees to lock it firmly.

Fresnel lens—concentrates beam
15-watt projector lamp
Lamp socket
Spun aluminum yellow cone
Neoprene-insulated feeder wires with disconnect device so cable won't be torn up in case unit is knocked over
Penta-treated wood stake, with break-away groove
GROUND LEVEL

New! Landing Strip Lighting Only 30¢ Per Runway-Foot!

L-M's complete Flying Farmer Runway Lighting Package includes stake-mounted lighting units, cones, lamps, green threshold lights, control switch, and 10,000 feet No. 10 direct burial conductor for 2000-foot runway, only $600!

You can make safer landings in darkness, fog, or dust, by lighting your runway. You can do it economically, now, with L-M's new Flying Farmer runway lighting package. It's a highly efficient system, made by the manufacturers of the famous L-M Thermal Beam (TM) high intensity runway lighting system used at the largest airports.

This package contains everything you need for a simple, effective installation. You just plow a 6-inch-deep furrow, drop in the wire, drive the stakes at 200-foot intervals on both sides of the runway, hook up the cable, and you have a good, economical lighting system.

The system is designed to work directly off a 115-volt AC lighting circuit. Lamps are 15-watt, 105 lumens, giving 27 cp output. No. 10 plastic-covered wire keeps voltage drop down to only 5% at ends of runways. No transformers or complicated equipment. Everything is included in the package. Choice of 3 packages, for 2000, 2500, or 3000-foot runway. Suitable for landing strips, runways at smaller airports, and taxiways. Accessories available include photo-electric control, time switch, higher intensity threshold lights, small rotating beacon.

Get this L-M Flying Farmer Package now. Mail the coupon today for bulletin giving complete information and installation instructions. (No salesman will call unless you request it.) Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Choice of Three Kits

Each of these Flying Farmer lighting packages includes everything you need to install your own runway lighting system. Complete with instructions.

2000-foot Runway Package: 18 runway marker lights with clear lens; 12 threshold marker lights with green lens; approx. 10,000 feet No. 10 Ampyrol-yellow plastic covered solid copper wire for 2-wire multiple system; 30-amp fused switch for 2 or 3-wire entrance. Complete..... **$600.**

2500-foot Runway Package: same as above but with 24 runway lights and approx. 12,000 feet of wire..... **$725.**

3000-foot Runway Package: same as above but with 30 runway lights and approx. 14,000 feet of wire..... **$850.**

ACCESSORIES AVAILABLE

Any of the three "Flying Farmer" kits gives you a complete runway lighting system. You don't need any extras. But for those who want extra convenience, we offer these accessories at moderate cost.

Scotch-Lite tape which you can apply to cones.

Photocell Tabet Relay: turns lights on automatically when night falls.

Time Switch with electric clock that turns lights on or off at any predetermined time.

Medium Intensity Elevated Runway Light, with 40-watt lamp and green lens, gives higher intensity light for threshold markers.

Rotating Beacon: for mounting on pole or tower, gives you a flashing marker to find your own airport at night.

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Airport Lighting

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Airport Lighting Division,
Line Material Company,
Milwaukee 1, Wisconsin: **EW-83**

Please send me, without obligation, complete information on the "Flying Farmer" runway lighting packages.

Name.....

Business.....

Address or Box No......

City.....*State*.....

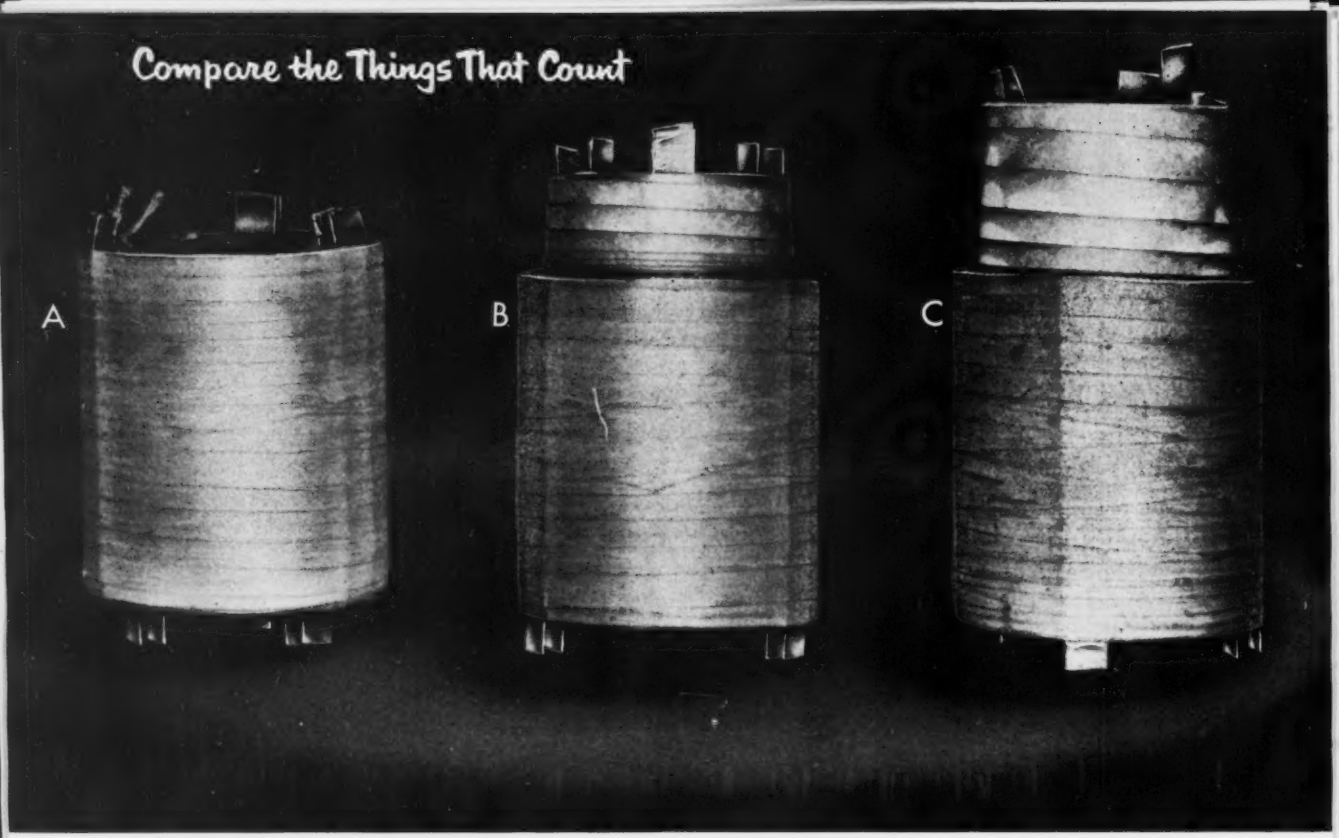


FIGURE 1: Results of the new shock test of varnish bonding strength. Coil A, impregnated with the best varnish, shows no separation. Coils B and C show too much separation, and the varnishes were rejected. For comparison, a coil whose insulation paper is brushed with shellac during winding will be torn almost completely apart, and an unimpregnated coil will be entirely separated.

FIGURE 2: Impregnated coil prepared for the shock test. Steel straps around the inner coil are fastened to the yoke at the top; straps around the outer coil are fastened to the bottom yoke. Coils will be violently jerked in opposite directions.

"Round-Wound" is a Line Material Company trademark

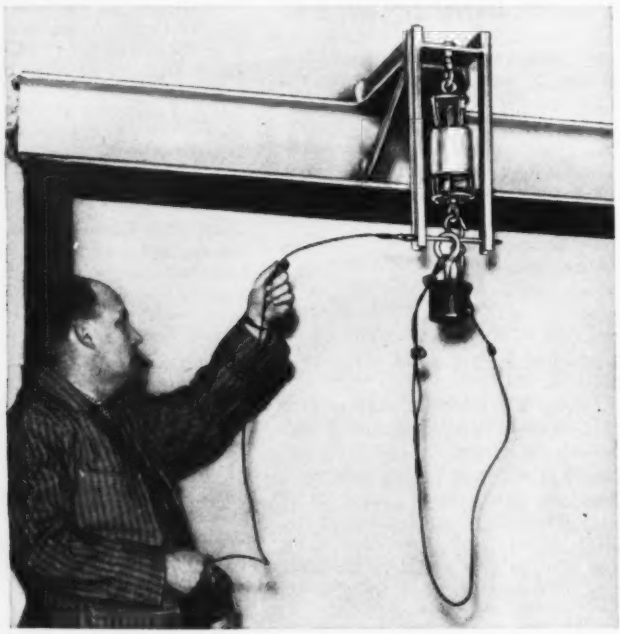


FIGURE 3: Shock test equipment. The top yoke is hung from a rigid support. A 10-pound weight attached to the bottom yoke by a steel cable is dropped 7 feet, resulting in an impact shock of 212 pound-feet per second. The amount of separation of the high voltage from the low voltage winding after one impact determines bonding strength of the varnish being tested.

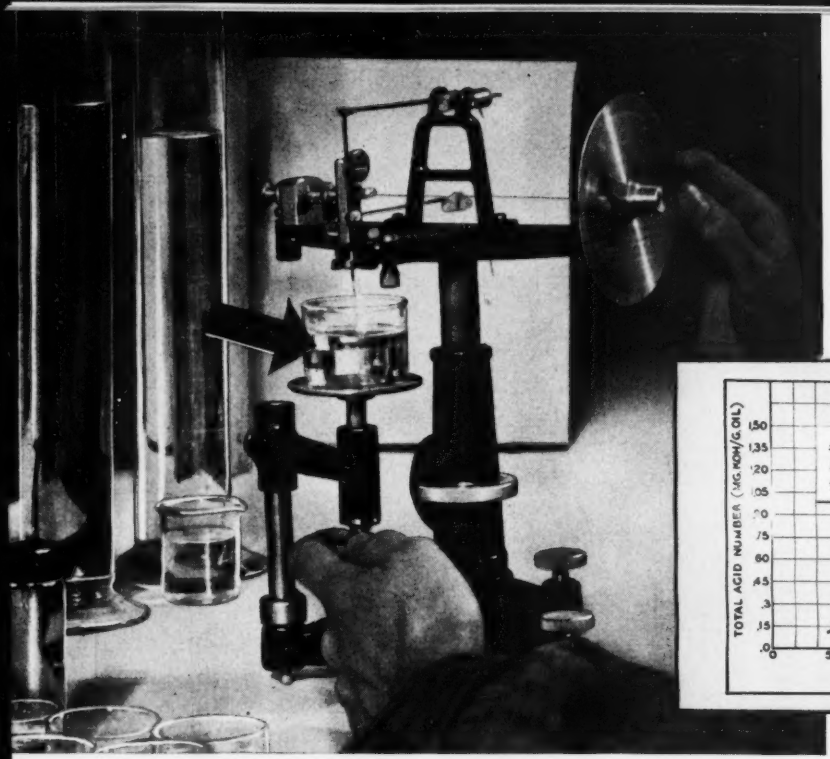
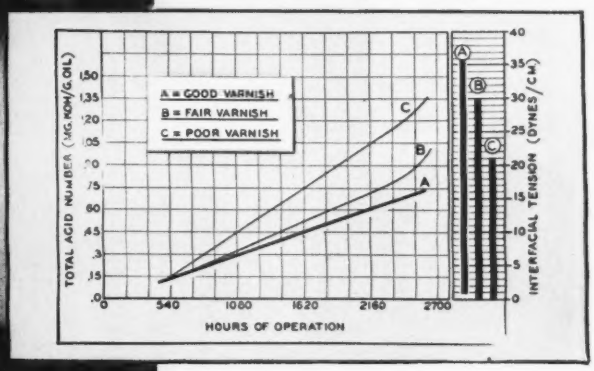


FIGURE 4: Interfacial tension tests of transformer oil (arrow), before and after cured varnish samples have been baked in the oil, are accurate predeterminations of the long-term resistance of the varnish to the oil.

FIGURE 5: Curves show long-term oil acid number for three different varnishes; bars show comparative short-term interfacial tension of the same varnishes.



L-M Develops New Varnish Tests To Assure Stronger Coils In Round-Wound Transformers

In addition to bonding strength, varnish requirements include low curing temperatures and freedom from contamination of or by the oil.

by **MARTIN I. ZWELLING**
Chief Laboratory Engineer
Transformer Division
Line Material Company

The primary, if not the single, reason for varnish impregnation of transformer coils is to resist short-circuit mechanical shocks. Under abnormal currents, windings tend to fly apart radially, and coils try to separate axially. In addition to strong blocking and clamping, good varnish impregnation is a substantial aid in resisting these forces.

But the problem is to get the right varnishes. Some varnishes will tend to dissolve in oil and thus lose their bonding strength. Others may appear not to dissolve but may actually contaminate the oil in long-term service and cause it to deteriorate more rapidly.

Curing must be complete, throughout the entire mass of the varnish and the coil. Some varnishes require curing temperatures so high that the life of the cellulose insulation is seriously reduced. Some varnishes simply do not possess the inherent bonding strength needed to resist short-circuit shock.

Recommended New Procedures

One drawback to selecting varnishes which meet all the requirements has been the lack of adequate tests for determination of varnish characteristics. Therefore we have developed new procedures to give us the necessary information.

One test (Fig. 4) provides a measure of the short-term resistance of varnish to transformer oil. Another measures the long-term resistance. Correlation between the two tests is very high. Compare the long-term rise in acids to short-term interfacial-tension test results in Fig. 5.

Bonding Strength Test

A new test was developed for varnish bonding strength (Figs. 1, 2, and 3). This test endeavors to pull sample coils apart by mechanical shock. An unimpregnated coil will be torn completely apart. Only the very best varnish completely resists separation.

Correlated With Service Conditions

Tests have been checked and closely correlated with actual service conditions, by comparing the condition of the oil and the resistance to short circuit of actual transformers impregnated with the various grades of varnish, with the laboratory tests of the same varnishes.

Benefits To Transformer Users

As a result of the program, we have been able to secure varnishes that have better resistance to oil, greater bonding strength, and lower curing temperatures so that there is less effect on cellulose insulation. Excellent characteristics of normal properties, such as dielectric strength, are also obtained.

All of these activities are part of a broad L-M engineering program that has been markedly successful in providing, in L-M Round-Wound transformers, the most desirable performance characteristics, with the added benefits of low operating costs and exceptionally long life.

Get The Whole Story On Round-Wound Transformers

Get the facts on the outstanding characteristics, the "Balanced Performance" of L-M Round-Wound Transformers. *Compare the things that count!* Ask the L-M Field Engineer for Bulletins and information; or write Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).

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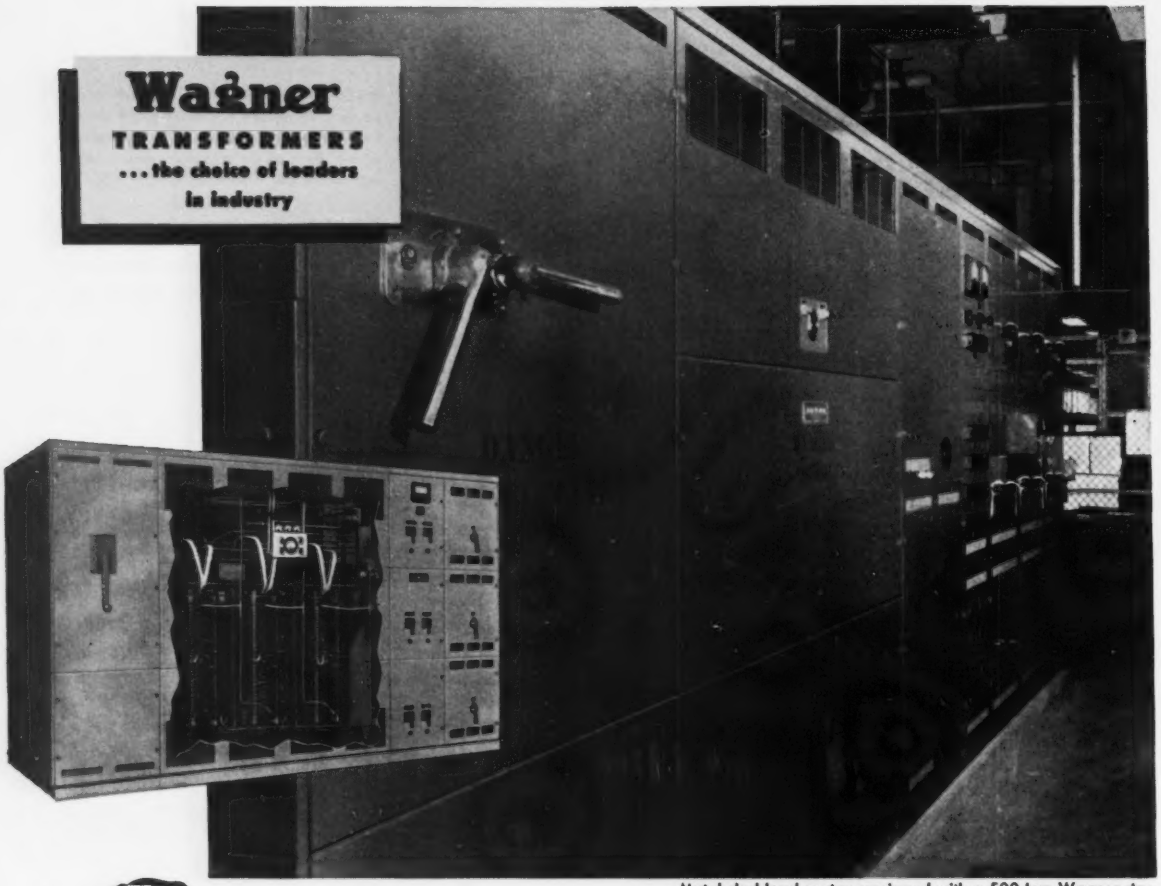
LM® LINE MATERIAL Transformers



Metal-clad load-center, equipped with a 500 kva Wagner dry-type transformer, at Western Electric Company, Allentown, Pa.

...to keep their voices smiling

For as long as we can remember, telephone companies have been doing a better job every year. Equipment improves—users get better service—and operators keep their voices smiling. Much credit for this continued progress must go to the Western Electric Company, which has devoted more than 70 years to the manufacture of the dependable equipment and apparatus that help make our telephone service the finest on earth.

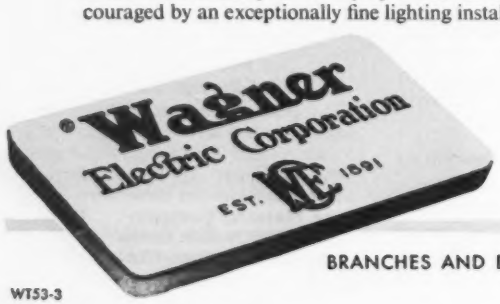
In addition to telephone manufacture, Western Electric also turns out much special equipment for America's Armed Forces.

At Western Electric's Allentown, Pennsylvania plant, better workmanship and employee morale are encouraged by an exceptionally fine lighting installation. 17,500 high-level fluorescent lamps, augmented by local lighting, help employees perform delicate operations on tiny parts.

Power for this lighting load, and for more than 5000 pieces of production equipment, is supplied by seven load-center substations, each equipped with a 500 kva Wagner Dry-Type Transformer.

Wagner Transformers are an important part of the equipment of many great industrial plants. In every case they are adding to their reputation for complete dependability . . . for unfailing service . . . that helped to influence Western Electric to install Wagner Transformers.

A Wagner engineer can help you select the right transformer for *your* requirements. Consult the nearest of our 32 branch offices, or write us.



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ELECTRIC MOTORS
TRANSFORMERS
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AUTOMOTIVE
BRAKE SYSTEMS—
AIR AND HYDRAULIC

WT53-3

Total Electricity Consumption in European Countries—1951

Country	Consumption (millions of Kwhr) Domestic	Industrial	Transport	Total	Population (millions)	Kwhr per Capita
Austria	1,280	3,703	544	5,527	6.91	800
Belgium	1,157	7,511	347	9,015	8.68	1,039
Denmark	925	1,272	84	2,281	4.30	530
Finland	612	3,408	22	4,042	4.04	1,000
France	6,400	25,450	1,650	33,500	42.20	794
Greece	282	265	40	587	7.60	77
Germany, West	9,317	33,048	1,848	44,213	48.10	919
Great Britain	24,050	32,850	2,700	59,600	48.90	1,219
Ireland	548	269	.....	817	2.96	276
Italy	5,500	15,550	2,900	23,950	46.60	514
Netherlands	2,220	4,553	380	7,153	10.26	697
Norway	5,300	9,990	260	15,550	3.29	4,726
Portugal	230	565	75	870	8.61	101
Spain	1,525	4,650	475	6,650	28.10	237
Sweden	4,236	10,817	1,426	16,479	7.07	2,331
Switzerland	3,857	5,267	1,092	10,216	4.75	2,151
Turkey	176	610	18	804	21.10	38
Yugoslavia	350	1,849	.....	2,199	16.32	135
Satellites:						
Bulgaria	280	550	40	870	7.30	119
Czechoslovakia	1,000	7,600	240	8,840	12.40	713
Germany, East	3,750	14,600	250	18,600	18.60	1,000
Hungary	350	2,180	220	2,750	9.30	296
Poland	1,310	7,950	240	9,500	25.20	377
Rumania	400	1,575	90	2,065	16.10	128
Total	7,090	34,455	1,080	42,625	88.90	
All Other	945	2,918	59	3,922	7.31	
Total Europe	76,000	199,000	15,000	290,000	416	697
U. S. A.	85,500	226,900	5,760	318,160	153.4	2,074

Source: "Recent Developments in the Electric Power Situation in Europe" a Study by the Electric Power Section United Nations Economic Commission for Europe, Geneva, March 1953, Tables III (p 5) 1 (p 3 Annex II) and 2 (p 8 Annex II).

New Computer to Figure Transmission Economies

American Gas & Electric Service Corp has ordered a calculating machine designed to figure more precisely and more quickly the economies of transmission in a major electric power system. The machine, known as a "penalty factor computer" is expected to save American Gas & Electric Co $100,000 a year in operating costs.

The computer is being built by General Electric Co with delivery expected in about 15 months. It will cost more than $100,000.

AG&E believes it will be able to achieve a higher degree of operating economy on its system through use of the computer because the machine will determine instantaneously the correction factors to be applied in scheduling power plant loadings to minimize the adverse effect of transmission losses. The new 2½-ton board, which will be 12 ft long and 5 ft high, uses a comparatively new mathematical formula which is built into the maze of 1,290 variable settings. These settings are related mathematically to the physical layout of AG&E's system.

The board will be installed in the AG&E system production coordination office in Columbus, Ohio.

Georgia Power Tells City It Will Not Sell Facilities

City of Dublin, Ga., may have to build its own power plant and distribution facilities if it follows a proposal of its officials that the city go into the power business.

Officials were considering purchasing the facilities of Georgia Power Co in the city, but the private company has announced quite vehemently it has no intention of selling its properties in Dublin or selling power to a municipal power system which might be set up. The utility has been sending statements to customers and running ads in the local paper declaring that the city will get better service and lower rates by sticking with the private company than it would if a municipal system were set up.

The Dublin municipal power system was sold in 1925 to a predecessor company of Georgia Power for $200,000.

'Draft' of Labor Message Recognized States' Rights

Although the so-called "draft" of a White House message to Congress on Taft-Hartley labor law amendments was weighted heavily in favor of organized labor, it did, however, seem to recognize state laws regulating public utility strikes.

It asked that Taft-Hartley include a rule fixing a dividing line between federal and state jurisdiction. Such a rule, it said, should "save to the states their right to preserve public order within their boundaries, and also recognize the right of any state in the absence of federal action under the national emergency provisions of the act, to protect the health or safety of the state during any labor dispute which the governor finds creates a state of emergency."

Twelve states restrict utility strikes. Massachusetts, Missouri, New Jersey, North Dakota and Virginia provide for state seizure. Indiana, Kansas, Michigan, Nebraska, Pennsylvania, and Wisconsin laws call for arbitration. Minnesota has fact-finding.

The "draft" leaked out of the White House, stirring up a flood of protests from supporters of Taft-Hartley because of its partiality toward organized labor. The White House later said the published version was preliminary, "not even approaching the semi-final stage."

Plant Excavation Started

Excavation work has begun on Utah Power & Light Co's $10.5-million 66,000-kw mine mouth steam-electric plant at Castle Gate, Utah. The plant will be located near the present tipple of Independent Coal & Coke Co. Coal will be hauled from the mine mouth to the plant by a 2,000-ft conveyor belt which will extend to the tipple.

Santo Tomás:

A Sacrifice to

CARLOS DAVILA, former president of Chile and head of special United Nations technical mission to Latin America

Time is running out for Santo Tomas de los Platanos. With its little colonial-style church, shaded doorways and white-washed walls, this Mexican village will soon become an aquatic ghost-town, submerged under tons of water backed up on the Ixtapan de Oro River.

A dam to be built for Mexico's largest hydroelectric project, Tingam-

Santo Tomás de los Platanos soon will disappear beneath a power

FROM THE MOUNTAINSIDE high above the Santa Barbara plant of the Miguel Aleman System can be seen the Mexican village of Santo Tomas (upper left). Village will be flooded by a hydro electric project downstream which will make most of the valley a reservoir

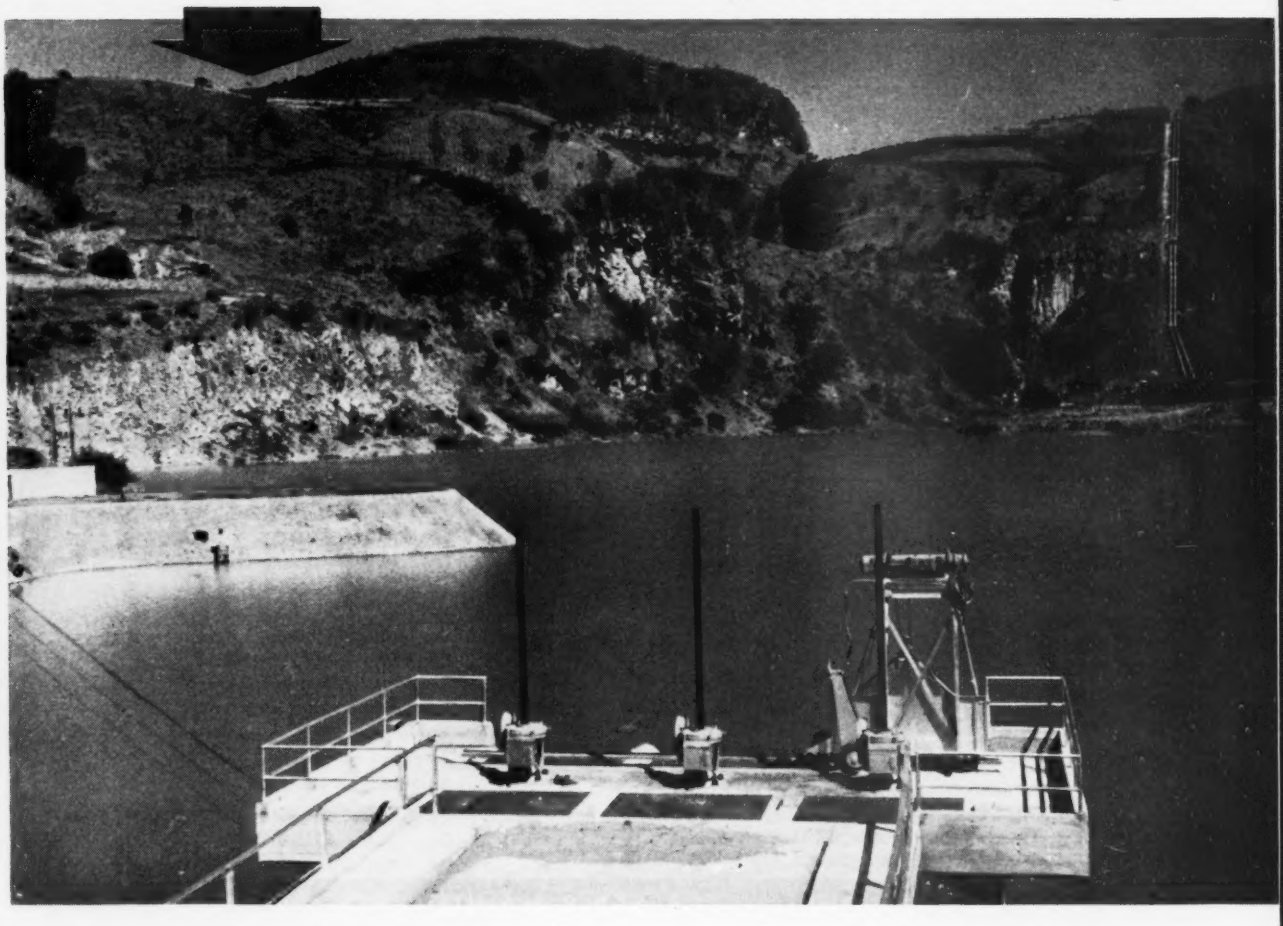
Hydro Power

bato in the Miguel Aleman System, will be the cause of the village's inundation. Already engineers have completed a 15-mile access road to the site, west of Mexico City, of the 150,000-kw underground plant. Next month they'll begin building a six-mile tunnel to run between the dam and powerhouse. And then the dam itself, to form a reservoir in the valley in which Santo Tomas lies.

Two Factions . . . Some of the 800 inhabitants, whom I met as I walked

(*Continued on page* 44)

reservoir like this but . . . **. . . its parish will not be dispersed**



SANTA BARBARA RESERVOIR is on a level above the reservoir that will inundate Santo Tomas. From this point water drops down through penstocks (seen behind town in both pictures at top of page) to run the turbines of Santa Barbara Plant, shown in picture at left

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Standardized

New KEARNEY Type K and T Made to Meet EEI-NEMA Standards

Developed in cooperation with EEI and NEMA to provide industry-wide standard fast (K) and slow (T) fuse links . . . *plus* providing such exclusive KEARNEY features as:

- **Threaded button terminals for true mechanical interchangeability**
- **Color-coded packages (silver for type T—gold for type K) to save time and confusion on the job**
- **Easy-to-use, "pull-out" package**
- **Greater accuracy and dependability**

or Specialized

Type 200 . . . with extra heavy surge and overload capacity

Type KS . . . with the same surge capacity as Type 200, but twice the overload capacity

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Type QA . . . faster fusing than Type X

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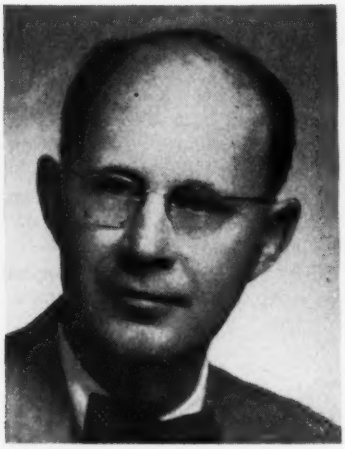
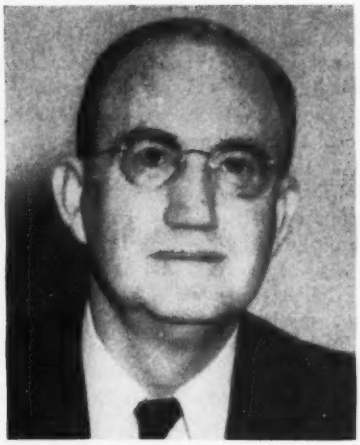


J. R. BRODERICK



J. C. HAPPENNY

Central Illinois Names 2 VPs

Broderick and Happenny elevated, after E. F. Kelly resigns as chairman of the board. Tulpin also promoted

Central Illinois Public Service Co has elected two new vice presidents. They are J. R. Broderick, former manager of the company's Southern Division, who will have supervision of operations, and J. C. Happenny, former assistant to the vice president, who will supervise commercial, customer, and employee relations.

The action was taken after E. F. Kelly had resigned his post as chairman of the board of directors after 40 years' service. As part of the change, Roy B. Tulpin, present vice president and controller, will be vice president in charge of finances.

Long Service . . . Broderick joined Central Illinois' engineering department in 1926, after graduation from the University of Illinois with a degree in electrical engineering. In 1930 he was transfered to the Southern Division and became superintendent at Jerseyville in 1933, leaving there in 1940 to assume duties as superintendent at Macomb. He was named Southern Division manager in 1943.

Wide Background . . . Happenny entered the utility field in 1929, after four years with the sales department of the United States Gypsum Co. He joined Central & South West Utilities Co, Dallas, Tex., serving as assistant to the treasurer. He later become secretary and assistant treasurer, and was named treasurer of Central Illinois Public Service in February, 1933. He served in that capacity until 1939, when he assumed the presidency of Oklahoma Power & Water Co.

After nine years in that capacity, he returned to Central Illinois in 1948 as assistant to the vice president in charge of operations.

Kelly, who will continue as a director, entered the utility field as an industrial power salesman for New York Edison Co, and joined Central Illinois Public Service's commercial department in March, 1913.

After service in World War I, he returned to the company as a division manager in 1919. He was named assistant to the vice president in 1928, advanced to vice president and director in 1932, and became chairman of the board in 1949.

•

Robert W. Osterholm has been named manager of Ohio Power Co's new commercial department, which consists of the consolidated commercial, industrial, and residential sales departments. Osterholm, formerly executive assistant to the vice president and general manager, will direct the sales of the consolidated departments and industrial promotion activities.

Henry W. Pirkey, Jr, has been made comptroller and a member of the board of directors of Southwestern Gas & Electric Co to replace C. C. Herrmann, who resigned recently to accept the post of financial vice president of Wisconsin Power & Light Co (EW, June 22, p. 23). Pirkey, who began his career with Southwestern G&E in 1925, has served as assistant comptroller since 1948.

R. L. Dunten, assistant director of industrial development for Central Power & Light Co, Corpus Christi, Tex., has been named commercial manager of the utility. **A. R. Kennedy,** formerly commercial manager, has been transferred to the company's engineering department as superintendent of the land and right-of-way division, a new post. **O. W. Jones,** director of industrial development in the commercial department, has retired after 27 years' service with Central P&L.

Edward D. Flavin has been appointed manager of the newly-formed Public Utilities Section of Johns-Manville Corp. Flavin has been manager of the New York district since 1946.

Audrey N. Prentice, who has been assistant general manager of Indiana & Michigan Electric Co since July, 1950, has been named to the same post with Ohio Power Co, Canton, Ohio. Both companies are subsidiaries of the American Gas & Electric Co. Prentice thus returns to the utility where he started his career in July, 1928. Before going to Fort Wayne, he was assistant to the vice president and general manager of Ohio Power.

Named a Vice President

Charles D. McAllister has been appointed vice president of American Manufacturing Co, Brooklyn, N. Y., cordage firm. McAllister, formerly sales manager, will continue to direct the company's selling activities. He has served American Manufacturing in various capacities for more than 20 years.

G. R. McARTHUR

McArthur Named...

. . . president of North Central Electric Association. Others elected at annual meeting

G. R. McArthur, vice president, Northwestern Public Service Co, Huron, S. D., has been elected president of North Central Electric Association, Minneapolis.

Other officers elected at the league's 34th annual meeting: James F. Owens, Jr., vice president Northern States Power Co, vice president; J. A. Hennessy, auditor, Northern States Power Co, treasurer; and John W. Lapham, Minneapolis, secretary-manager.

McArthur joined Northwestern Public Service in 1930 as director of employee and public relations, and was made a director and vice president in 1937.

•

John H. Winchell has been named chairman of the Colorado Public Utilities Commission, succeeding **Joseph W. Hawley,** who resigned last month.

F. E. Foster has been named manager of the Metallurgical Division of Riley Stoker Corp, Worcester, Mass. He has had extensive experience in metallurgical investigations and is active on several committees of the American Society of Testing Materials.

E. B. Shaw has been appointed assistant development engineer in Philadelphia Electric Co's engineering department. **F. J. Berger** has been named assistant electrical engineer, electrical engineering division, and **F. W. A. Myers** inside plant engineer in charge of substation and generating station design.

R. N. Benjamin, mechanical engineer, has been named chief engineer of Georgia Power Co. **E. S. Harrison,** hydraulic engineer, has been promoted to assistant chief engineer, mechanical division, and **E. J. Archbold,** electrical engineer, to assistant chief engineer for the electrical division.

T. H. Mason, H. P. Bull, H. E. McCullough, and **W. A. MacDonough** have been named to posts in the newly-consolidated sales departments of Crosley and Bendix Home Appliances Divisions of Avco Mfg Corp. Mason has been made director of kitchen appliance sales; Bull, director of laundry sales; McCullough, director of Crosley electronics sales, and MacDonough, director of advertising and merchandising.

James A. Lewis has been appointed superintendent of the meter department of Western Massachusetts Electric Co, Springfield. Lewis, who joined the company in 1925 as a meter reader, succeeds **Merton B. Dexter,** who has retired. Dexter started with the utility in 1911.

OBITUARY

Philip Torchio, Jr

Philip Torchio, Jr, 45, commercial vice president of American Gas & Electric Co, died in Tupper Lake, N. Y., Aug. 9.

Torchio, who graduated from Massachusetts Institute of Technology in 1930, joined AG&E's service corporation in 1948 as assistant to the operating vice president. He was named assistant to the vice president and general manager of Ohio Power Co, an AG&E subsidiary, in 1949 and assistant general manager in 1951.

Prior to joining the service corporation, he had been associated with Consolidated Edison Co of New York, Inc, for 16 years, serving in various capacities in the generating, distribution, sales, purchasing, and engineering departments.

During World War II he served three years with the Navy's amphibious forces.

Gaylord B. Buck

Gaylord B. Buck, 59, vice president and commercial manager of the Public Service Co of Colorado who won the 1934 McGraw-Hill national award for cooperation in the electric utility industry, died Aug. 2 in Denver.

Buck entered the electric industry in Mount Vernon, Ill., in 1909 and joined Public Service Co in Denver as sales manager in 1924. He was appointed general commercial manager in 1928 and was elected to the board of directors in 1932. He became a vice president in 1937.

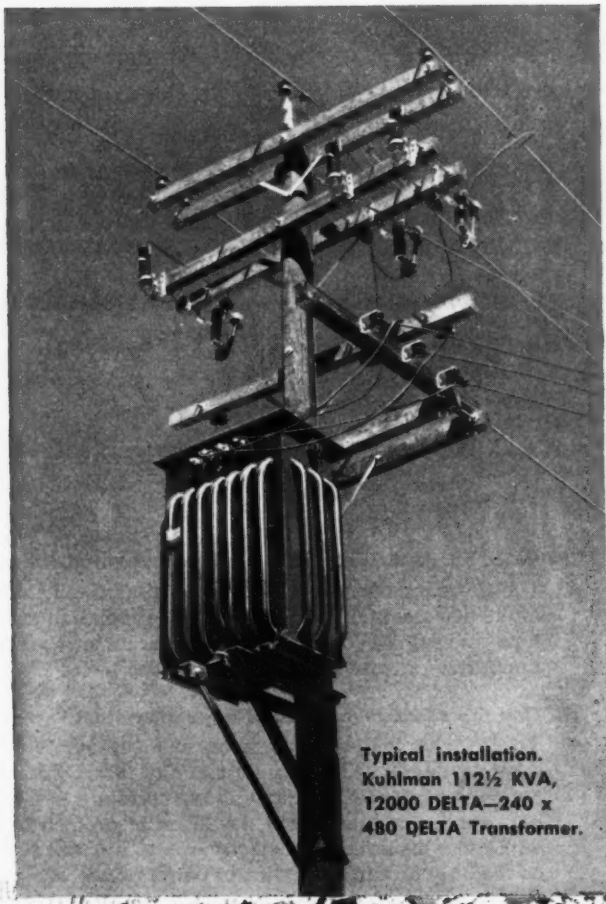
He was also president of the Rocky Mountain Electrical League in 1934-35 and again in 1941 and 1943.

Fay Woodmansee, 78, chairman of the board of Electrical Engineers Equipment Co, died July 28. He was president of EEE from time of its organization in 1909 until last year when he became chairman of the board. He entered the electrical industry with the General Electric Co in 1898.

Oswald Dale, 71, retired electrical insulation engineer and inventor, died recently in Nutley, N. J. He began his career with the General Electric Co in Pittsfield, Mass. In 1933 he founded and became vice president and treasurer of Electro Technical Products Co, after serving as a vice president for Irvington Varnish & Insulator Co.

Lloyd L. Weed, 52, manager of the customer service at Jenkintown, Pa., for Philadelphia Electric Co, died recently. He started with the company in 1919.

74 KUHLMAN TRANSFORMERS help convert arid desert into fertile farmland



Typical installation. Kuhlman 112½ KVA, 12000 DELTA—240 x 480 DELTA Transformer.

A few years ago, the land surrounding Pecos, Texas, was a vast tract of sandy desert where mesquite, cactus and catclaw were the principal vegetation. Today, this same land produces a bountiful harvest of cotton, cantaloupe, alfalfa, grain sorghum and many other crops. For electricity, providing the energy to pump water from irrigation wells, has made it possible to reclaim thousands of acres of the parched range land. Seventy-four Kuhlman three-phase Transformers helped accomplish this miracle.

Kuhlman Transformers have been serving agriculture and industry with dependable equipment for more than 60 years. Kuhlman Transformers include power, distribution, dry type, Saf-T-Kuhl, subway, rural, series and C.S.P.

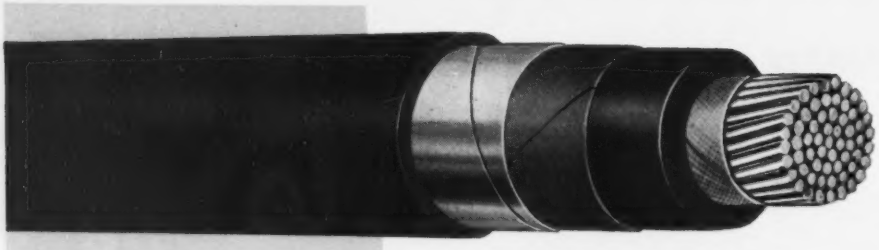
The new modern plant of Kuhlman Electric Company at Crystal Springs, Mississippi is ready to supply the needs of utilities and industries throughout the South. Write today for complete information.

Kuhlman ELECTRIC COMPANY

BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: *International Standard Electric Corporation,*

15th Floor, 50 Church Street, New York 7, New York. CABLE ADDRESS: Microphone, New York

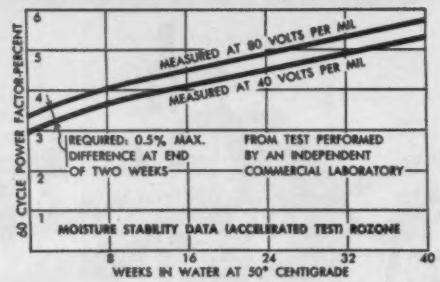


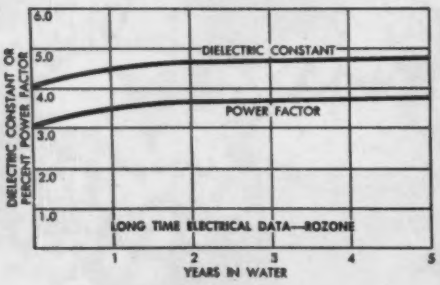
500,000 CM, single conductor shielded, RoZone-RoPrene power cable, rated at 9 KV.

Rome RoZone®

Superior Ozone-Resistant Insulation Deserves Your CONFIDENCE

As indication of their behavior in service and conformity to specification, insulated cable specimens are measured electrically for moisture absorption after long-time immersion in temperature controlled water baths.


60 CYCLE POWER FACTOR-PERCENT
MEASURED AT 80 VOLTS PER MIL
MEASURED AT 40 VOLTS PER MIL
REQUIRED: 0.5% MAX. DIFFERENCE AT END OF TWO WEEKS
FROM TEST PERFORMED BY AN INDEPENDENT COMMERCIAL LABORATORY
MOISTURE STABILITY DATA (ACCELERATED TEST) ROZONE
WEEKS IN WATER AT 50° CENTIGRADE



What Its Exceptional Moisture Resistance Means To You

Q: What effects can moisture have on cable insulation?

A: The presence of moisture absorbed in cable insulation alters its electrical character and, depending on the type of insulation, may effect those characteristics most important for service . . . causing failure.

Q: Can the effects of moisture be predetermined?

A: Yes . . . by long-time electrical measurements or by recently developed electrical stability tests. Since it is not only a question of "how much" moisture is present but, even more important, its location or distribution within the insulation, an electrical test is considered to be the only truthful yardstick of performance.

Q: Does RoZone resist moisture satisfactorily?

A: Yes. Experience and long-time test data have proved RoZone has exceptional *electrical stability in the* presence of water and its performance is not impaired by exposure to water.

Q: Where could cable insulation become appreciably exposed to water during service?

A: In submarine service, buried directly in the earth, or in wet ducts or conduit. Water is present almost everywhere and may condense in raceways or on cables suspended in air. RoZone is recommended for any of these applications.

It Costs Less to Buy the Best

RoZone is approved and accepted by leading utilities, industrials and consulting engineers.

ROME CABLE
Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

ROME CABLE ROME, N.Y.

4 Labor Topics to Be Studied...

. . . at EEI Industrial Relations Committee Conference, Oct. 12-14, at Chicago. Utility vice presidents will participate

Employee selection, selling fringe benefits to rank and file employees, control of benefit costs, and preparing for negotiations will be discussed before this year's annual round table conference of the Industrial Relations Committee of the Edison Electric Institute. The meeting will be held Oct. 12-14 in the Sheraton Hotel at Chicago.

The round table conference this year is being directed not only to the industrial relations personnel of electric companies but also to their management people interested in establishing more effective human relations.

The conference will get underway with a general meeting at which these industrial relations leaders will discuss the following:

1. "Selection of Employees," R. G. Kenyon, vice president, Southern California Edison Co.

2. "Selling Fringe Benefits to the Rank and File Employees," C. B. Boulet, director of personnel, Wisconsin Public Service Corp.

3. "Control of Benefit Costs," J. C. Arnell, senior assistant personnel director, Consolidated Edison Co of New York.

4. "Preparation for Negotiations," H. K. Breckenridge, vice president, West Penn Power Co.

After these talks, the members will divide into eight groups to discuss in further detail the above four topics. Each group will have a conference leader assigned to it. These sessions will take place on Monday and Tuesday afternoons, Oct. 12-13, and Tuesday and Wednesday mornings, Oct. 13-14.

Utilities Presidents to Speak . . . The committee under the leadership of Jay Alan Reid, vice president, Southwestern Gas & Electric Co, has arranged for well-known electric utility executives to speak at luncheons on facets of "Management's Responsibility".

On Monday Walter H. Sammis, president of Ohio Edison Co and EEI, will discuss "Management's Responsibility in the Atomic Age." On Tuesday, George M. Gadsby, president of Utah Power & Light Co and a former EEI president, will have as his topic, "Management's Responsibility to Its Service Area". On Wednesday Ernest R. Acker, president of Central Hudson Gas & Electric Corp and also a former EEI president, will speak on "Management's Responsibility to Manage."

Vice Presidents Will Participate . . . For those able to stay Wednesday afternoon, the committee has arranged a panel discussion, "Ask the Veeps." These veeps will be available: V. C. Brennan, Union Electric Co of Missouri; J. S. Grady, Florida Power Corp; W. L. Jones, Potomac Electric Power Co; F. L. Larkin, Wisconsin Electric Power Co; W. F. Moses, New Jersey Power & Light Co; C. Y. Osborn, Long Island Lighting Co; and F. R. Rauch, Cincinnati Gas & Electric Co. They will be ready on the firing line to answer questions or discuss problems on industrial relations which the conference members might have.

Reservations may be made through E. S. Evans, Edison Electric Institute, 420 Lexington Ave, New York 17, N. Y.

Labor Unions Ask Seattle City Light for Wage Hike

Labor unions representing City Light employees at Seattle have asked City Council for 1954 wage increases in varying amounts, plus such fringe benefits as prepaid medical plans.

All unions except one are in the Joint Crafts Council of City Light unions, organized several years ago for bargaining purposes. Local 77 of the International Brotherhood of Electrical Workers-AFL informed the City Council, however, that it has left the Crafts Council and will bargain by itself, presumably dissatisfied with past joint bargaining efforts. It asked for a general 12% wage boost and improved vacation allowances.

Among unions represented by the Crafts Council, office employees requested a seniority wage plan, with special benefits up to $25 monthly for persons with more than 25 years' service. Ironworkers and operating engineers asked for increases of $40 a month.

The unions are starting early this year on their wage negotiations, contending City Council refused to bargain with them in good faith last year.

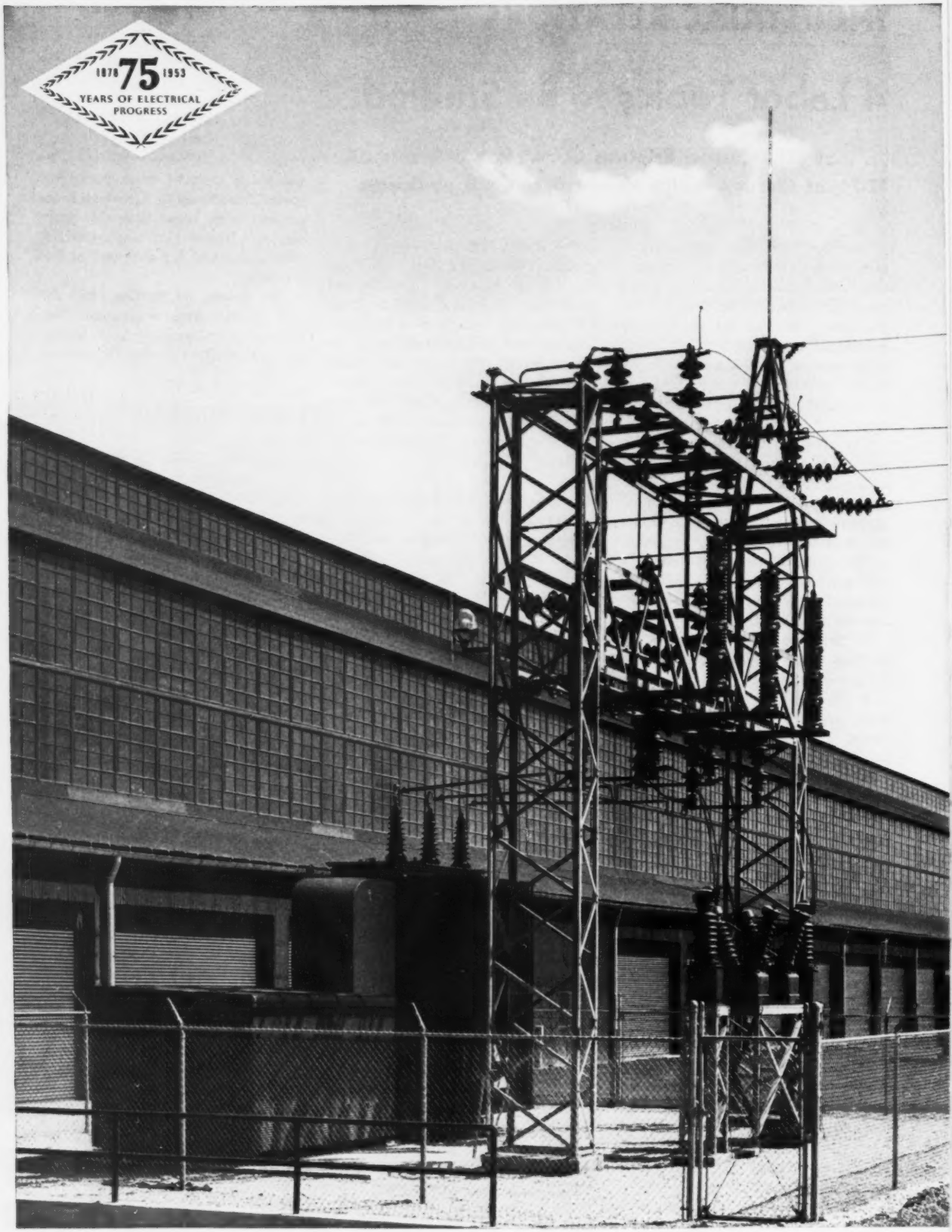
LABOR BRIEFS

Consolidated Edison Co of New York and International Brotherhood of Electrical Workers, AFL, sign contract that provides a general across-the-board increase of 8¢ an hour to workers employed on Staten Island. Terms of contract, retroactive to July 1, will remain in effect through February, 1954.

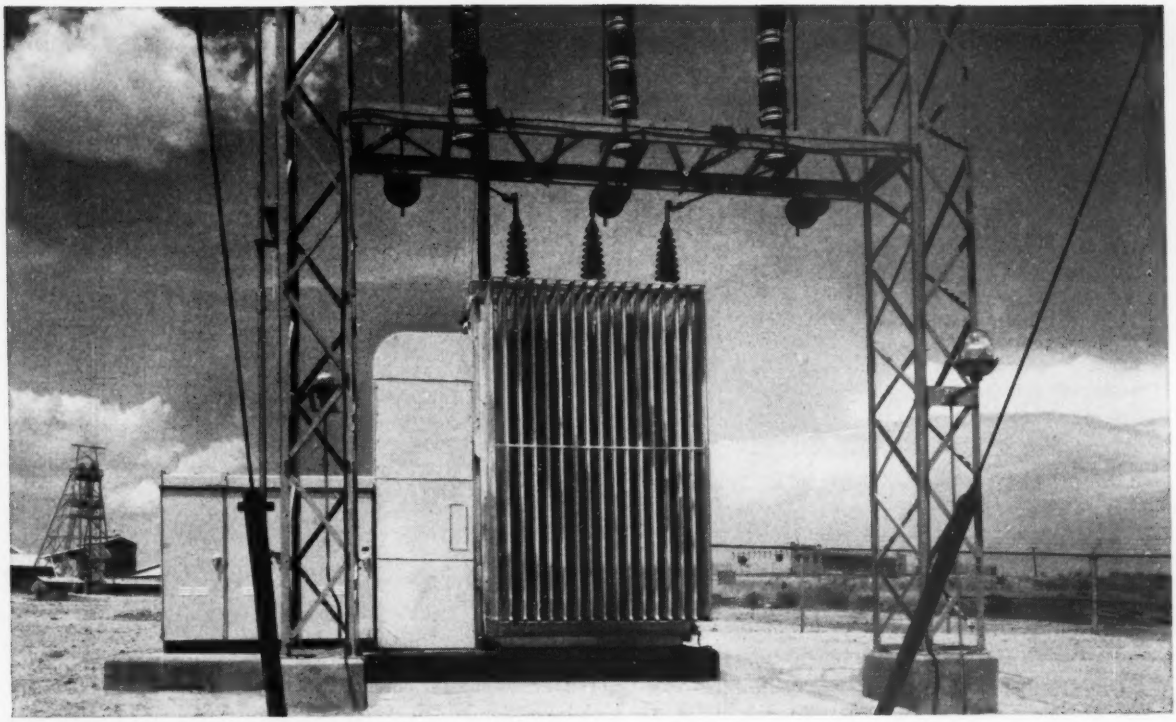
Cheyenne Light, Fuel & Power Co workers, members of the IBEW-AFL, have been on strike for several weeks. As EW went to press, federal mediation service was scheduled to meet with company and union. Strike affects electrical installers and maintenance men, clerical and accounting personnel.

Stevens Institute of Technology has just released a booklet, "What's Engineering?" by Dr Jess H. Davis, president of the institute. Designed to answer questions about the work engineers do, the 16-page publication also discusses the scholastic attainments and special aptitudes which indicate whether a student should seek admission to an engineering college. For copy, write Dr Jess H. Davis, president, Stevens Institute of Technology, Hoboken, N. J.

Seven topics of immediate concern to personnel executives, as indicated by a survey of more than 3,000 personnel administrators in all parts of the United States, will be discussed Sept. 28-30 at the American Management's Association's national personnel conference in the Hotel Statler at New York.



INDUSTRIAL INSTALLATION of G-E substation will take care of power needs of the Aviation Division of The Bingham-Herbrand Corporation, Fremont, Ohio. Many utilities recommend industrials install package substations at service entrances.



5000-KVA PACKAGE SUBSTATION is often best size for industrials. Southwestern Public Service Co. installed "building-block" unit at entrance of Duval Sulphur & Potash Co., Carlsbad, New Mexico—saved investment in unused capacity.

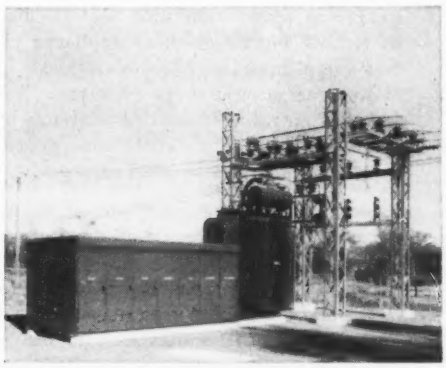
G-E package substations give utilities low-cost answer to fast-growing loads

Unit installations keep pace with greater industrial power demands

Installing new power service entrances for industrial sites—or revamping old service entrances—can become a simple, easily handled job for utilities. Whether one industrial plant or five is involved, General Electric's economical package and master unit substations can help solve problems of rapidly increasing load density.

Small package substations take care of individual plant requirements in isolated sections, and can be added to existing service installations in areas of concentrated industry. Either way, utilities can keep units economically small—only large enough to meet expected load growth—and they can avoid heavy investment in large substations with unused capacity.

Package substations reduce costs, give flexibility for shifting loads, save installation time by using co-ordinated components. For details, write for GEA-4500, "Package Substations," General Electric Company, Schenectady 5, N. Y. 882-1



IN EXPANDING INDUSTRIAL AREA, centrally located small substation of Niagara Mohawk Power Co. assures sound distribution investment.

GENERAL ELECTRIC

One of 3,374 housewives in Sacramento Municipal Utility District contest ponders . . .

"I Want an Electric Range Because . . ."

$4,500 in appliance prizes awarded in promotional program that promises million dollar sales in the future

Sixty-day contest promoting electric ranges has produced an expressed interest in about $1¼ million worth of ranges in the area served by Sacramento Municipal Utility District. Sponsored by Sacramento Valley Electric League in cooperation with SMUD, the contest had as its reward $4,500 worth of appliance prizes for the 20 best completions, in 25 words or less, of the statement "I want an electric range because. . ." Twelve different makes of ranges were donated as awards by manufacturers and distributors. Eight consolation prizes of small appliances were provided by the League.

Typical Entries . . . Primary aim of the promotion was to create a greater desire for electric ranges by selling the advantages of cooking electrically. Total of 3,374 entries received represents more than 5% of all homes in SMUD service area not equipped with electric cooking facilities. Although about 10 entries were of the "sob-story" type, remainder stressed some salient feature of electric cooking. Typical of winning entries were these:

- I'd like to be able to cook the dinner, clean the kitchen, and still have the energy to be bewitchin'.
- All of the advantages are plain, but most important are the "Big Three," cleanliness, speed and economy.
- Cleaner flameless heat, cooler kitchens, less meat shrinkage, more flavor in oven cooking, exclusive thrift cooker, fully automatic, no flue.

Rules covering the promotion were relatively simple. Entrants had to live within SMUD service area and be at least 16 years old. They could submit as many entries as desired but could win only one prize. Usual contest rules such as neatness and originality were set up. Entry blanks were available at appliance dealer stores and the District's business office.

Selling Points Stressed . . . Contest advertising pointed out that dealers know advantages of electric cooking and that entrants could pick up some good ideas from them. Advertising also promoted main selling points of electric cooking.

Entry into the contest was tacit admission of a desire to own an electric range. Thus dealers had an excellent opportunity to present their sales story whenever an entry blank was requested. Entry blanks were imprinted with dealers' names and after being judged were returned to dealers for prospect lists. Blanks issued by the District were returned to dealers on a pro-rata basis.

Action by the League was necessary to forestall customer reluctance to buy during the contest and to overcome dealer objections. The League guaranteed dealers the price of any range sold during the contest if it was returned by a customer winning a range. However, reluctance to buy did not materialize; toward conclusion of the contest several large-volume dealers reported an increase in range sales.

Plenty of Publicity . . . Contest was widely advertised. There were 72 newspaper ads, 145 radio spots, and full-time showings on billboards, car cards, and in dealer stores.

Dealers were supplied window banners and counter cards with pockets for entry blanks.

Newspaper mats were also supplied for tie-in ads by dealers handling makes of ranges being promoted. A series of newspaper ads featured various makes with a picture of the range and this headline: "Win this (price and name) electric range."

Contest was judged by a group of Sacramento businessmen not connected with the appliance trade but well versed in merchandising. Occasion of the contest was used to conduct a survey among SMUD customers. Entry blank carried a check list in which entrants could indicate if they had or wanted an electric washer, clothes dryer, dishwasher, air conditioner, and television set. Although completion of the list was not a condition of the contest, 80% of the entrants supplied the information. The "wants" outnumbered the "haves".

Electric Heat . . .

. . . used first time in a Birmingham apartment building. Other electric gear included

Birmingham, Ala., has completed its first electrically-heated apartment building. The 12-unit structure uses glass panel electric heaters in bedrooms, living rooms, and bathrooms, besides which all apartments have electric ranges, water heaters, and refrigerators.

The panel heaters have automatic thermostats for control of temperature in each room. Eight of the living centers have two 1,000-w heaters in the living room, one 1,000-w heater in the bedroom, and one 600-w heater in the bathroom.

Because of increased outside exposure, the four end apartments have three 1,000-w heaters in the living room, two 1,000-w heaters in the bedroom, and one 600-w heater in the bathroom.

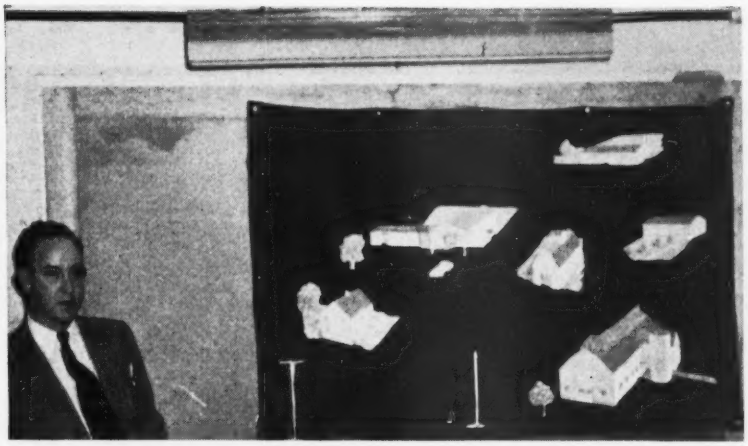
Costs Compared . . . Prior to construction, B. G. Brasher, prominent Birmingham builder who supervised the work, obtained a comparative study from Alabama Power Co on cost of all-electric v. all gas equipment. It revealed a saving of 4½% by going all-electric.

He also found that cost of construction increased when gas piping was installed for heating and wiring for ranges and water heaters. Further, the builder would effect saving in redecorating expense and less upkeep with all-electric installations.

Figures compiled by Alabama Power on average for the first billing period ending April 2 showed 438 kwhr usage, and a bill of $7.51. For second billing period usage was the same and costs had dropped three cents.

Figures covered all electricity used for cooking, water heating, house heating, light, and miscellaneous appliances.

Since the two billing periods were at the tail end of the heating season, it is expected that usage will be somewhat higher when colder weather sets in again.



Distribution system and load center is shown with aid of a black flannel cloth for background, adhesive cloth cutouts for buildings, trees and poles, and white wool yarn for lines.

Kit Shows Farm Electric Layout

How to layout the distribution system on a farm and to find the load center is demonstrated with the aid of a simple kit by M. O. Whithed, rural supervisor for Atlantic City Electric Co. In addition, ideas are advanced for the place to attach the service lines at the buildings and near the load, such as the kitchen at the rear of the house. Demonstrations are in conjunction with promotion of adequate wiring on the farm.

For the demonstration, the kit consists of (1) a black flannel cloth approximately 30x48 ft for a background; (2) adhesive cloth cutouts of buildings, trees and poles which adhere to the flannel cloth and can be placed as desired to meet suggested layouts; and (3) white wool yarn to represent service lines from the distribution pole to the meter pole and to the buildings.

Accompanying illustration shows the distribution layout for a dairy farm of the following buildings and connected loads—residence, 10 kw: work shop, 10 kw; pig pen, 1.6 kw for a brooder; chicken house, 3.2 kw for 2 brooders; grain storage, 3 hp for grain drying; barn and silo, 10 kw plus 5 hp for hay drying and 5 hp for gutter cleaner; or approximately 46 kw total.

Lamp Program Launched On Nationwide Basis

A lighting industry program to set new standards in portable lamp beauty and lighting effectiveness was launched by more than 200 electric utility executives, portable lamp manufacturers, and retailers who met in Cleveland last month. Highlight of the meeting was a model Lamp Fashion Festival, at which new portable lamps and a new way to buy them were unveiled.

The "festival" is intended as a model for similar showings to be sponsored by utilities on a nationwide basis beginning this fall and continuing through 1954. Co-sponsors of the program are the Lamp & Shade Institute of America and General Electric Co's Lamp Division.

No. 5
IN A SERIES

AN ENGINEER ASKS —

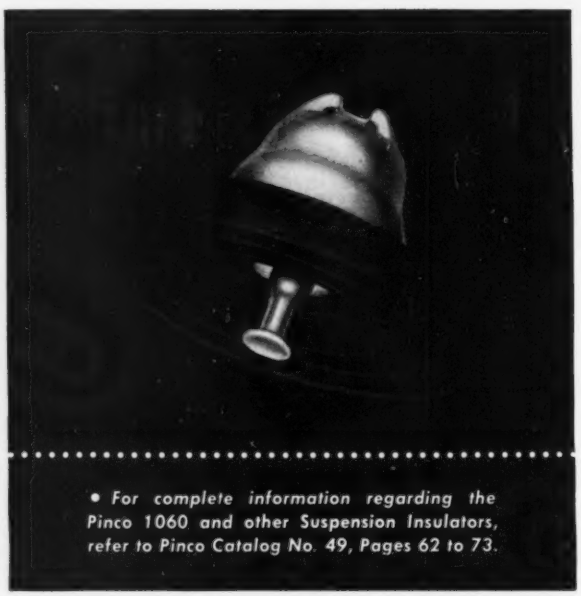
"why, even in severe sleet storms which caused conductor and tower failures, have we never had a mechanical failure with a PINCO 1060?"

HERE'S THE REASON

The answer to this question can be summed up in one statement . . . it is because Pinco Suspension Units are *designed and built to meet service needs* and not just to meet specification requirements. In other words, the correct basic design and rugged construction of Pinco Suspension Units provide extra mechanical and electrical strength for that added margin of safety even under the worst operating conditions.

PINCO SUSPENSION INSULATORS are *better* insulators because—

they are 10% HEAVIER! . . .
at least 20% STRONGER! . . .
and 25% BETTER ON IMPACT TESTS! . . . proof that they are always "RIGHT for the Job" and "RIGHT on the Job." Remember this when you specify and buy suspension insulators.



• For complete information regarding the Pinco 1060 and other Suspension Insulators, refer to Pinco Catalog No. 49, Pages 62 to 73.

PINCO INSULATORS
RIGHT ON THE JOB—

The Porcelain Insulator Corporation
LIMA, NEW YORK

If you do not have a copy of the Pinco No. 49 Catalog, write us or contact the Joslyn office in your locality.

Cable Rides Waves before Submerging

Big shipping job had to be completed before Potomac Power Co could lay a 69-kv gas pressure cable in the Potomac River. The cable, manufactured by Okonite Co, is shown being transferred to a barge at Camden, N. J., for shipment to Washington, D. C. Four reels are in place and a fifth is being lowered. Each reel weighed 79,000 lb and the lifting beam 6,000 lb. Cable, in 2,150 ft lengths, was shipped under 40 lb of gas pressures, applied through the pig tail terminal at the trailing end of the cable.

MANUFACTURERS' EARNINGS

Company	Period Months	Ended	Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Allied Chemical & Dye	3	June	$11,894,045	$10,819,107	$1.34	$1.22
Allied Chemical & Dye	6	June	21,719,447	20,633,771	2.45	2.33
Anaconda Wire & Cable	6	June	3,602,231	3,092,344	4.27	3.66
Arrow-Hart & Hegeman Electric	6	June	832,174	766,119	1.66	1.53
Blaw-Knox	3	June	943,854	856,478	.67	.61
Blaw-Knox	6	June	1,971,887	1,872,851	1.40	1.33
Bridgeport Brass	3	June	1,643,310	861,383	1.72	.91
Bridgeport Brass	6	June	2,874,774	1,911,866	3.01	2.01
Brown	28 wks	June	1,475,425	3,107,414	...	...
Driver-Harris	3	June	169,286	110,321	1.90	1.24
du-Pont (E. I.) de Nemours	3	June	58,037,442	50,895,217	1.22(a)	1.06(a)
du-Pont (E. I.) de Nemours	6	June	114,758,123	101,708,123	2.41(a)	2.12(a)
Electric Storage Battery	6	June	354,869	920,324	.39	1.01
Fairbanks, Morse	6	June	1,861,604	2,296,862	1.55	1.92
Harvey Hubbell	6	June	519,150	522,700	1.62	1.63
Koppers	6	June	4,572,341	4,772,786	2.29	2.40
Minnesota Mining & Mfg	3	June	4,701,252	3,646,872	.57(c)	.44(c)
Minnesota Mining & Mfg	6	June	9,056,111	7,486,720	1.09(c)	.91(c)
Motorola	3	June	1,466,471	891,569	.76	.51(b)
Motorola	6	June	4,640,679	3,129,704	2.40	1.78(b)
National Vulcanized Fibre	3	June	258,184	95,458	.48	.18
National Vulcanized Fibre	6	June	466,684	342,878	.87	.64
Okonite	6	June	1,500,626	1,056,731	9.39(c)	7.08(c)
Owens-Corning Fiberglas	6	June	2,858,515	2,405,320	.91	.76
Phelps Dodge	6	June	18,878,591	17,551,944	1.86	1.73
Philco	3	June	8,815,000	1,948,000	2.47	.52
Philco	6	June	12,216,000	4,289,000	3.41	1.16
Radio Corp of America	3	June	8,892,087	4,223,410	.57(c)	.25(c)
Radio Corp of America	6	June	18,185,228	11,299,930	1.18(c)	.70(c)
Reynolds Metals	6	June	9,987,089	6,196,634	5.61	3.46(c)
Sangamo Electric	6	June	1,186,714	1,027,749	1.70	1.47
United States Steel	3	June	55,640,806	22,218,922	1.89	.61
United States Steel	6	June	105,016,764	65,753,134	3.54	2.04

Notes—(a) Based on average number of shares; (b) Adjusted to reflect payment of 100% stock dividend in July, 1952; (c) Based on shares outstanding at close of the period.

Sylvania's 6-Month Sales At All-Time Record High

Net sales of Sylvania Electric Products, Inc, in the first six months of 1953 totaled $149,092,932, an all-time company record for a half year's operations. Pres H. Ward Zimmer also reported that net income and net sales for the three months ended June 30 were the highest for any second quarter in Sylvania history.

Sales for the first half compared with sales of $104,226,623 in the first six months of 1952. Net income for the first half of 1953 amounted to $5,169,092, or $1.87 per share, against $3,398,776, or $1.48 per share a year earlier.

Second quarter sales totaled $69,-032,624, compared with $48,239,162 in the April-June period of 1952. Net income for the second quarter of 1953 was $2,395,849 compared with $1,445,005 for 1952.

Line Material Develops Runway Lighting Package

Line Material Company has developed a low cost, complete Runway Lighting Package for flying farmers and small airport and airpark operators. The equipment is designed to make landing safer in darkness, ground fog, haze, smoke or dust.

This package contains everything needed for a simple and effective installation for a 2,000 ft landing strip or runway. The cable is simply dropped into a 6 in. deep plowed furrow and stakes for the lights are driven 200 ft apart on both sides of the strip. The system works directly from 115-v ac lighting circuit.

New Kearney Fuse Links

Development of a full line of preferred and non-preferred ratings of fuse links conforming to the new EEI-NEMA type K (fast) and type T (slow) standards has been completed by James R. Kearney Corp, St. Louis. Ratings of ½, ¾, and 1½ amp, having similar electrical characteristics but not included in the EEI-NEMA standards, have also been developed for protection of transformers.

MEETINGS CALENDAR

American Institute of Electrical Engineers
Pacific General Meeting, Hotel Vancouver, Vancouver, B. C., Sept. 1-4; Middle-Eastern District Meeting, Daniel Boone Hotel, Charleston, W. Va., Sept. 29-Oct. 1; Fall General Meeting, Muehlebach Hotel, Kansas City, Mo., Nov. 2-6.

Edison Electric Institute
Commercial Sales Section Committees, EEI headquarters, New York, Sept. 3-4; EEI-AGA Accounting Division Organization Meeting, Hotel Statler, Detroit, Sept. 15-18; Accident Prevention Committee, Radisson Hotel, Minneapolis, Sept. 21-22; Prime Movers Committee, Detroit, Oct. 5-6; Transmission-Distribution Committee, Hotel Nicolet, Minneapolis, Oct. 8-9; Industrial Relations Committee, Fall Round-Table Conference, Sheraton Hotel, Chicago, Oct. 12-14; Meter & Service Committee, William Penn Hotel, Pittsburgh, Oct. 19-21; Electrical Equipment Committee, Jung Hotel, New Orleans, Nov. 2-3.

Illuminating Engineering Society
National Technical Conference, Hotel Commodore, New York, Sept. 14-18.

Northwest Public Power Association
Accounting Section, Monticello Hotel, Longview, Wash., Sept. 17-18.

Public Utilities Association of Virginias
Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 17-20.

Maryland Utilities Association
Fall Conference, Cavalier Hotel, Virginia Beach, Va., Sept. 18-19.

Rocky Mountain Electrical League
50th Annual Fall Convention, Broadmoor Hotel, Colorado Springs, Colo., Sept. 20-23.

National Association of Railroad and Utilities Commissioners
Hotel Roosevelt, New York, Sept. 20-26.

***Missouri Valley Electric Association**
Accounting Conference, Sept. 21-22; Sales & Rural Conference, Oct. 7-9, President Hotel, Kansas City, Mo.

***New England Meter Engineers**
Fall Meeting, Casco Lodge, Casco, Me., Sept. 24-25.

***Pennsylvania Electric Association**
Relay Committee, Fall Meeting, Irem Temple Country Club, Dallas, Pa., Oct. 1-2; Transmission & Distribution Committee and Electric Equipment Committee, Joint Meeting, Abraham Lincoln Hotel, Reading, Pa., Oct. 8-9; Meter Committee, Fall Meeting, Brunswick Hotel, Lancaster, Pa., Oct. 22-23.

Southeastern Electric Exchange
Fall Meeting, Engineering-Operation Section, Carolina Hotel, Pinehurst, N. C., Oct. 1-2; Accounting Conference, Battery Park Hotel, Asheville, N. C., Oct. 15-16; General Sales Conference, Atlanta Biltmore Hotel, Atlanta, Ga., Nov. 19-21.

American Society of Mechanical Engineers
Fall Meeting, Sheraton Hotel, Rochester, N. Y., Oct. 5-7; Annual Meeting, Statler Hotel, New York, Nov. 29-Dec. 4.

Association of Edison Illuminating Companies
Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va., Oct. 8-10.

National Association of Electrical Distributors
Fall Meeting, Pacific Zone, Hotel del Coronado, Coronado, Calif., Oct. 11-14.

American Standards Association
4th National Standardization Conference and 35th Annual Meeting, Waldorf-Astoria, New York, Oct. 19-21.

*Addition this week.

A Sacrifice to Mexican Power

(*Continued from page* 31)

streets recently, were not quite reconciled to this prospect. The village priest informed me that his parishioners were for a time engaged in a violent dispute over the two alternatives opened to them. One group, planning to emigrate to the cities or resettle independently in other towns, wanted hard cash for their properties; the other insisted that they must remain together and move as a unit to the larger lands and better houses which the government will allocate to them higher up on the mountain.

The troubled padre's prayers have been heard; his flock will not disperse. He consoles the older and more forlorn members of his congregation with descriptions of the comforts they will enjoy in their new village which will be provided with electricity by the very waters which will inundate their present homes.

Have they not heard, the padre then asks, of the prosperity other villages in the area are already enjoying as a direct result of this hydro project which happens to be uprooting them?

This system, called "Miguel Aleman" in honor of the man who during his presidency gave electrification its driving impulse, covers a vast region and is the most grandiose in Latin America. When finished it will trap the waters of seven rivers: Malacatepec, Ixtapan, Tilostoc, Amanoles, Zitacuaro, Tuxpan, and Temascaltepec.

Power Complex . . . Six plants will, when in full operation in 1955, fill the needs of the Mexico City area.

Promoter of this vital power in Mexico is the Comision Federal de Electricidad (Federal Electricity Commission), created in 1937 under Pres Lazaro Cardenas for the express purpose of organizing "a national system of production, transmission and distribution of electric energy."

The great impetus needed by CFE came in 1949 when it received governmental blessing as a "legally recognized, autonomous authority with property rights." It is financed by securities, a 10% tax on electric energy consumed and funds allocated by the government.

Since the commission became autonomous it has made tremendous strides. Investments have zoomed from $19.5 million in 1949 to over $125 million in 1952, or 480 times as much as in 1939. Of these, about $80 million was in external credits, granted mostly by the International Bank of Reconstruction and Development, the Export-Import Bank, and the rest by private companies.

Besides the loans to the CFE, the Bank has lent $26 million to the Mexican Light & Power Co, Ltd, making a total of $80 million toward electrical development in Mexico. It calculated that by 1955, Bank-financed projects will have contributed 700,000 kw, bringing Mexico's total capacity to a total of 1,850,000 kw—almost double the capacity of 1949.

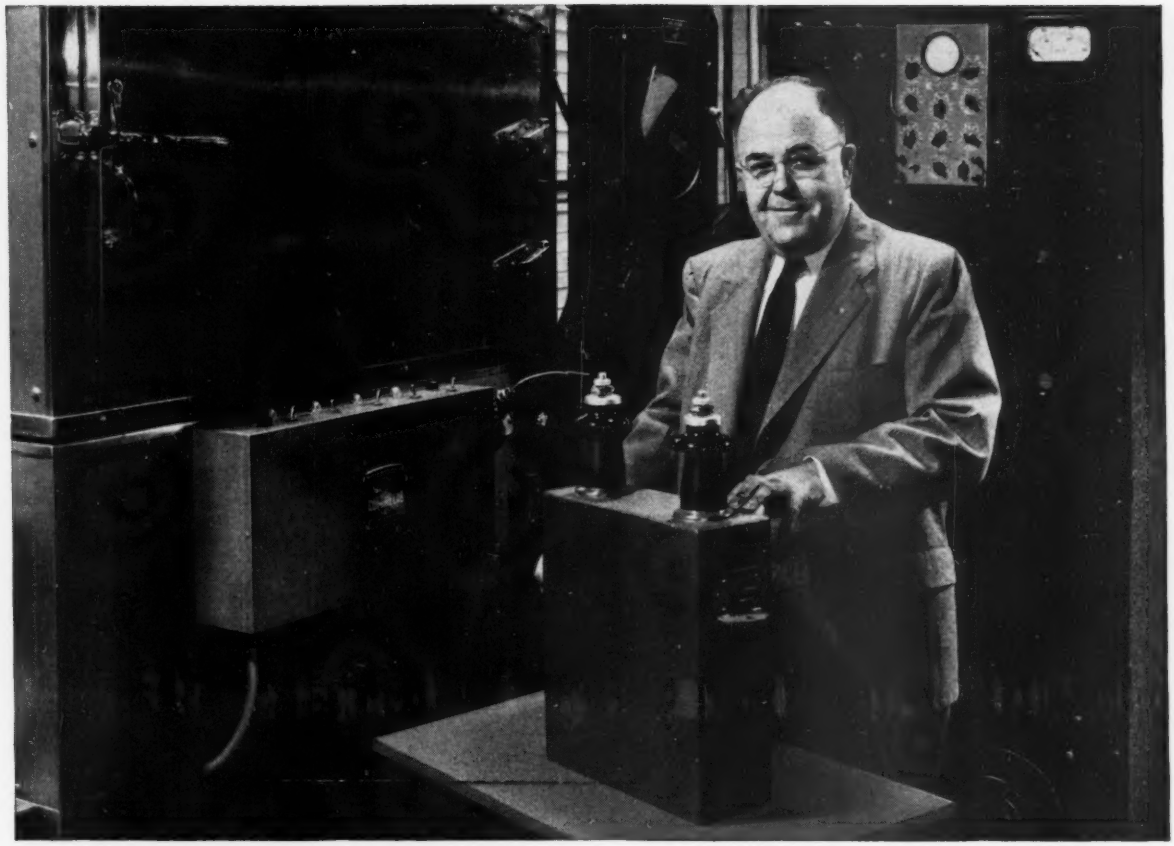
CFE has twelve plants under construction and has completed a total of 77 containing 215 generating units. These are spread out over 24 of the 26 states of Mexico.

A hydro-electric system only recently initiated at Papalcapan will be even more important than the "Miguel Aleman" and will be modeled after the Tennessee Valley Authority in the United States. $14,450,000 already has been allocated to it.

This flood of dollars contrasts interestingly with the pecuniary difficulties which accompanied the birth of the "Miguel Aleman" in 1938. At that time engineers and workers had to endure the most incredible hardships. They slept on the bare ground, worked with inadequate equipment, ate little and sometimes not at all, roads being practically nonexistent.

Today, with stepped-up financing, work on Miguel Aleman System is proceeding at a good pace, with these hardships eliminated.

The area, where once the Aztecs worshipped the sun and sacrificed to it human lives in fear that it might otherwise withhold its life-giving energies, is becoming acutely aware of this other form of energy which demands sacrifices only occasionally, like that of Santo Tomas de los Platanos, and brings not only light and energy, but prosperity as well.



Latest advance in Westinghouse Capacitor design

One capacitor for both high and low-temperature applications

The new Westinghouse Inerteen® capacitor now entirely eliminates the need to stock capacitors for two extremes of climate.

Extensive laboratory testing and over three years of actual field experience have proved the ability of this new capacitor to withstand energizing at temperatures as low as minus 40° F . . . a decrease in temperature limit of 25° F over previous standard units.

Investigations in the opposite direction have gone up higher than the industry standard of 104° F (average ambient) without excessive losses, corona, aging or any type of permanent change in operating efficiency.

This outstanding capacitor advance has been made possible by coordinated Westinghouse unit design features, *PLUS—an important change in the molecular structure of the dielectric fluid Inerteen.* Solder-sealed bushings and zinc spray finish, pioneered by Westinghouse, which have established an excellent field record, further insure trouble-free operation under all weather conditions.

For application under all climatic conditions, you will find that the new Westinghouse Inerteen capacitor meets every requirement. Call your Westinghouse representative today for more information, or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60853

YOU CAN BE SURE...IF IT'S Westinghouse

Cross-country "jogging" proves this transformer can *take it!*

Brockton-Edison's trailer-mounted "CSP®" Transformer gets more jolts and bumps in one day of cross-country service than the average transformer receives in a lifetime. Yet this "CSP" Transformer has performed perfectly every time it has been used to maintain service during emergency or routine transformer change-outs.

Brockton-Edison used "Westinghouse" for their ingenious trailer rig, because they needed an extra-tough transformer for such rugged service. They chose a "CSP" Transformer because its built-in breaker eliminates the necessity for any separately mounted protective devices. All they have to do is make the connection and use the "CSP" Breaker to pick up or disconnect the load.

"CSP" Transformers can take it, whether mounted on a pole or in a trailer, even under the most adverse conditions. Why not prove to yourself that Westinghouse "CSP" Transformers can cut distribution, installation and maintenance costs. Ask your Westinghouse representative for a copy of B-4247-B, *Transformer Costs . . . and their relation to Profits.* Or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70662

This 37.5-kva "CSP" Transformer fits compactly into Brockton-Edison's movable trailer because its built-in protection eliminates the need for separate protective devices and excess wiring. This ingenious arrangement simplifies change-outs, with fast service any time . . . anywhere.

YOU CAN BE SURE... IF IT'S

Westinghouse

Even after miles of hauling over bumpy, rural roads, this rugged "CSP" Transformer gives dependable service. Only normal external transformer connections need be made. The "CSP" Breaker is used to pick up the load.

WWP-Puget Hearings Go On

Public power forces are still trying to convince the Washington State PSC that the merger is not in the public interest

Public power forces are continuing to place testimony in the record to convince the Washington Public Service Commission that a merger of Washington Water Power Co and Puget Sound Power & Light Co is not in the public interest (EW, Aug 10, p 89).

R. W. Beck, consulting engineer for the Washington PUD Association, testified before the PSC that a contractual relationship between the two companies could save as much power as could a merger. Alan Paine, counsel for WWP, objected to this testimony on the grounds that the PSC was considering only a merger and not a possible contractual agreement. But the commission decided to listen to it and rule on its materiality.

Possible 15% Rate Hike . . . Attorney Ralph Purvis of Bremerton, formerly associated with the Kitsap County PUD, told the commission that the merger might result in a 15% rate increase in his county. Claiming that Puget is founded upon a more sound financial base than WWP, he reasoned that under a merger Kitsap County customers of the merged company might be forced to pay increased rates to strengthen the company's financial structure.

The Bremerton attorney, a member of the state legislature, also said he is fearful of the political influence which could be wielded by a company as large as would be created by the merger.

Any hope that WWP might have had of gaining complete control of the Rock Island Dam, built by Puget and enlarged by the Chelan County PUD, was shattered with a PUD statement that the PUD would not cooperate with WWP in operation of the dam.

PUD to Operate 6 Units . . . Six power units, installed in the Rock Island powerhouse by the PUD and currently operated by Puget under a lease agreement, will be operated by the PUD itself in the event of a merger, testified L. J. Richardson, Chelan PUD commissioner.

The agreement between the PUD and Puget contains a provision that prevents Puget from transferring or assigning its interest in the agreement to another party without permission of the PUD.

The Chelan PUD "does not give its consent nor does it intend to consent to the assignment or transfer to WWP of Puget's rights under the operating agreement and will not permit WWP to act as its agent to operate the district's facilities at the Rock Island Dam in event the proposed merger is effected," said the PUD statement.

Should the PUD operate the six units, its present operating costs would be increased $140,000 annually, Richardson testified.

Harvey F. Davis, attorney for the Chelan PUD, earlier had led L. C. Peterman of the Ford, Bacon & Davis engineering firm to admit that loss of Rock Island to the merged company would be a "disadvantage." The engineering firm's study for the commission of the proposed merger did not evaluate the position of the dam in the merged company, however, Peterman said.

Top Level Executives Investigated . . . Peterman had testified that his company had investigated only the top administrative and supervisory parts of the two organizations with a pay roll of approximately $838,000 out of a total pay roll of about $12.4 million a year, after upward arrangements made since Jan. 1.

"By consolidating positions, rearranging the organization, and in some cases adjusting salaries upward as justified by enlarged responsibilities, we evolved a payroll of a little over $668,000 a year," Peterman said.

"The economies resulting from this re-arrangement and consolidation is therefore about $170,000. We did not carry our investigation any further because of limited time and because as progress is made farther and farther down the line to the supervised manual and non-manual employee, there is less opportunity for savings due to the necessary geographical distribution of such activities as operation of plants, the maintenance and construction of transmission and distribution facilities, handling of customer contacts and similar functions," the Ford, Bacon & Davis engineer pointed out.

3 Utilities Sued

'Class suits' of $5 million brought by Oregon consumers for over collection of surcharges

Latest development in the tug-of-war over collection of surcharges by Oregon power companies during last winter's energy drought was the filing recently of three suits for recovery of the charges.

All are "class suits" brought by individuals on their own behalf and on behalf of all other Oregon customers of the three defendants—Pacific Power & Light Co, Portland General Electric Co, and Mountain States Power Co.

Two actions brought in Multnomah County ask $1,399,738 from Pacific P&L and $2,694,432 from Portland GE, plus costs and 15% attorney's fees. The third, filed in Lane County courts, asks $580,000 plus 20% for attorney's fees from Mountain States.

Meantime, the state Public Utilities Commissioner Heltzel has announced that hearings on the complaint of State Representative Monroe Sweetland and others that surcharges were illegally collected will be resumed on Aug. 25.

The three suits, which are alike in their major contentions, claim that the surcharges were not legal because the PUC neglected to file a formal order and the companies to file revised and definite rate schedules of tariffs and to ask for emergency hearings. Each asks that relief be credited to customers by the utilities or that funds be turned over to the courts for distribution.

Bringing action against PP&L are Great Northern Products, Inc, a Portland corporation, and William

Holstrom. Plaintiffs against PGE are Elmer McClure, master of the Oregon State Grange; Maurice and Kay Meriwether; and Mrs Anne Chambers. Complainants against Mountain States are Harold K. McPherson of Eugene. Helen Gilkey of Corvallis. and B. M. McKelvey of Goshen.

The plaintiffs say that in acting for Oregon customers they are saving the filing of individual suits for each month of the surcharge, which in the case of PP&L would total 480,000 suits. They list the state customers of each utility as 80,000 for PP&L; 210,000 for PGE; and more than 50,000 for Mountain States.

Paul B. McKee, president of PP&L issued a statement as follows:

"The temporary steam power surcharges made necessary by last fall's hydroelectric shortage were lawfully authorized, and in our opinion the suit is entirely without merit.

"Actual steam power costs greatly exceeded the amount allowed to be recovered by the affected companies. and in the recent hearings before the public utilities commissioner at Salem the complainants were unable to produce any evidence that the surcharge was not necessary and proper."

FINANCIAL BRIEFS

Arthur Andersen & Co has just issued its "Rate of Return Allowed in Public Utility Rate Cases—1915-1952." For copy, write F. Merrill Beatty. Arthur Andersen & Co, 67 Broad Street, New York 4, N. Y.

Federal Power Commission will hear Oct. 16 oral arguments on its proposed rule for Accounting and Reporting of Provisions for Future Income Taxes Resulting from Accelerated Amortization, Docket No. R-126. Time for submission of data, views. and comments has been extended to Oct. 1 upon the request of the Edison Electric Institute.

Union Electric Co of Missouri has made arrangements to take over the Missouri Edison Co, subject to Public Service Commission and Securities and Exchange Commission approval. Union will offer each share of Missouri Edison common stock 7/10th of a share of Union. Missouri Edison has 125,000 common shares outstanding.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE 1953									
Aug. 6	**3.26**	**3.32**	**3.50**	**4.31**	**4.47**	**4.76**	**5.36**	**5.62**	**5.74**
July 30	3.27	3.33	3.52	4.32	4.50	4.77	5.41	5.70	5.87
END OF QTR									
2nd 1953	3.34	3.46	3.64	4.47	4.70	4.88	5.52	5.93	6.10
1st 1953	3.15	3.23	3.39	4.16	4.41	4.66	4.95	5.24	5.50
4th 1952	2.99	3.03	3.14	4.06	4.22	4.59	4.98	5.33	5.62
3rd 1952	2.99	3.03	3.16	4.10	4.26	4.61	5.18	5.59	5.96

Data: Reis & Chandler, Inc.

EARNINGS

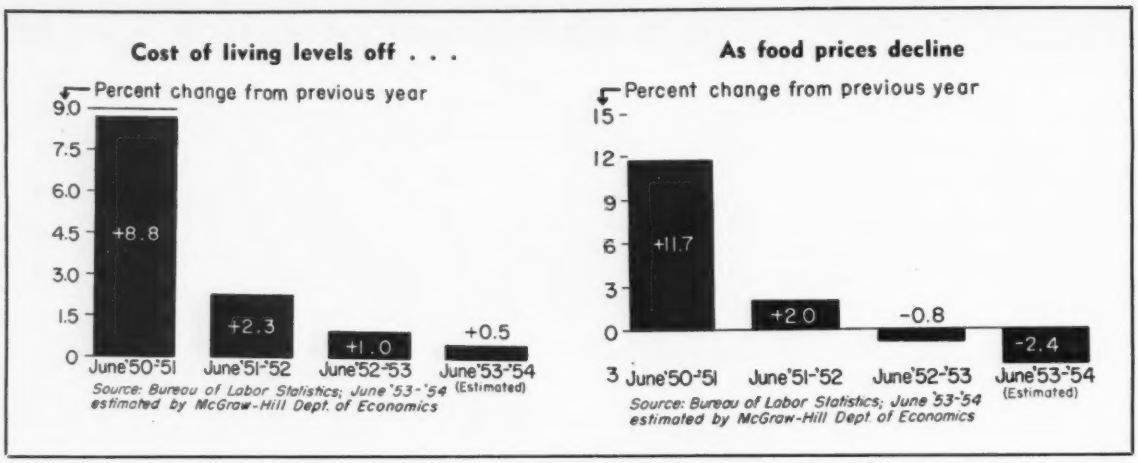
Company	Period Months	Ended	Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
California Electric Power, consolidated	12	June	$2,654,108	$2,102,543	$0.83	$0.81
Central Illinois Electric & Gas	12	June	1,899,451	1,846,598	2.30	2.22
Central Illinois Public Service	12	June	5,538,690	5,157,559	1.53	1.51
Commonwealth Edison, consolidated	12	June	35,456,820	30,225,526	2.31	2.10(a)
Community Public Service	12	June	1,265,685	1,035,372	....	....
Dallas Power & Light	12	June	4,645,118	3,613,417	....	....
Delaware Power & Light	12	June	3,929,052	3,291,018	1.93	1.63
El Paso Electric	12	June	1,608,764	1,501,378	2.02	1.88
Idaho Power	12	June	4,291,491	3,494,855	3.17(b)	3.10(b)
Interstate Power	12	June	2,453,783	2,103,642	0.92(c)	0.86(c)
Lake Superior District Power	12	June	957,198	929,984	....	....
Northwestern Public Service	12	June	945,734	859,548	....	....
Pacific Power & Light	12	June	4,562,826	4,013,437	....	....
Philadelphia Electric	12	June	28,523,079	27,173,547	2.30	2.18
Potomac Electric Power	12	June	6,119,715	6,067,053	1.11(e)	1.32(e)
Public Service of Indiana	12	June	10,940,258	9,321,304	2.24(f)	2.39(f)
Southern California Edison	12	June	22,747,870	21,572,636	....	....
Texas Electric Service	12	June	8,583,323	7,569,201	....	....
Texas Power & Light	12	June	8,420,454	6,888,353	....	....
Western Light & Telephone	12	June	1,130,104	933,916	2.37(g)	2.25(g)
West Penn Electric, consolidated.	12	June	13,563,756	11,971,180	3.21(h)	3.02(h)
Wisconsin Public Service	12	June	4,153,000	3,462,000	....	....

Notes—(a) Bi-monthly billing, adopted in August 1951 had a substantial adverse effect on electric and gas revenues and on earnings for the 12-month period ending June 30, 1952; (b) Based on 1,125,000 shares in 1953 and 900,000 shares in 1952; (c) Based on average shares outstanding during period; (e) Based on 5,117,040 shares in 1953 and 4,264,200 shares in 1952; (f) Based on 4,253,069 shares in 1953 and 3,579,363 shares in 1952; (g) Based on 391,009 shares in 1953 and 325,841 shares in 1952; (h) Based on 4,224,000 shares in 1953 and 3,960,000 shares in 1952.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
SCHEDULE FOR AUGUST—SEPTEMBER—OCTOBER			Bid Date
Bonds			
Southern California Edison—1st mtg due 1978	$30,000	.....	Aug. 25
Wisconsin Power & Light—1st mtg due 1983	8,000	.....	Aug. 31
Duke Power—1st and refunding mtg due 1983	35,000	.....	Sept. 1
Louisiana Power & Light—1st mtg due 1983	12,000	.....	Sept. 15
Duquesne Light—1st mtg	12,000	.....	Sept. 22
Mississippi Power—1st mtg due 1983	4,000	.....	Oct. 6
Metropolitan Edison—1st mtg due 1983	8,000	.....	.....
Debentures			
Central Hudson Gas & Electric—conv debs	$6,000	.....	Sept. 9
Preferred Stock			
Duquesne Light—100,000 sh $50 par	$5,000	.....	Sept. 17
Wisconsin Power & Light—20,000 sh $100 par cum (to be offered preferred holders without limit)	2,000	.....	.....
Common Stock			
Wisconsin Power & Light—329,194 sh (to be offered commonholders on 1-for-7 basis, record Aug. 14 to expire Sept. 8)	$.....	$.....	.....
Duke Power—208,321 sh (to be offered commonholders on 1-for-20 basis, record Sept. 2 to expire Sept. 18 without underwriting)	6,250	30.00	5.00%
Central Hudson Gas & Electric—140,000 sh (to be offered commonholders on 1-for-15 basis, record Sept. 9 to expire Sept. 24)	.....	.....	.....
Duquesne Light—150,000 sh	.....	.....	Sept. 15
New England Gas & Electric—194,916 sh (to be offered commonholders on 1-for-10 basis, record about Sept. 30)	.....	.....	.....
Hartford Electric Light—105,500 sh	.....	.....	.....
POSTPONED, UNSCHEDULED, AND/OR UNDER CONSIDERATION			
Bonds			
Eastern Utilities Associates—collateral trust	$7,000	.....	.....
Monongahela Power—1st mtg	10,000	.....	.....
Public Service Electric & Gas—1st mtg due 1983	50,000	.....	.....
Kansas Gas & Electric—1st mtg due 1983	10,000	.....	.....
Indiana & Michigan Electric—1st mtg	15,000	.....	.....
Long Island Lighting—1st mtg	25,000(e)	.....	.....
Southwestern Public Service—1st mtg	12,000(e)	.....	.....

Notes—(e) Estimated.



Living Costs Rise—But Slowly

Cost of living increases will be less of a burden on the consumer—and on wage paying industry—in the next 12 months. As of now, the prospect is that living costs will rise very little by the middle of next year.

The Consumers Price Index ("cost of living") is now so important that it influences the costs of practically every producer of goods in the nation—including electric power producers. Whiles wages are not so important to utilities as they are to industrial companies, they certainly can't be overlooked. And practically all wage bargaining now takes account of changes in the C-L index, even where contracts are not yet on a regular escalator basis. And higher wages, sooner or later, are reflected in the prices of goods bought by the utilities.

Food Is the Villain . . . Rising food prices have been behind most of the rapid increases in the cost of living in the past few years. (See charts). They were the chief cause of the sharp jump in the cost of living index in June—from 114.0 to 114.5 percent of the 1947-49 average.

But the rise in food prices is probably temporary. Over the next year, they are expected to decline, as they have in the past year. One reason is that U. S. farmers will be turning out another near record crop. The well-publicized drought in the Southwest will affect food production very little.

Another reason to expect a slight drop in food prices is that consumers may very well be earning less money at this time next year than they are now. Most economists expect industrial production to decline somewhat as a result of a lower level of output of defense products, automobiles, and capital goods.

Declines in income will probably not be severe, but they are expected to cut into the public's earnings a little—perhaps $5 billion, after taxes, by the middle of next year.

And lower incomes would mean somewhat lower demand for food. However, the cost of living will probably rise a little between June 1953 and June 1954, even if food prices go down. Most of the other goods that go into the index are expected to rise slightly in cost.

Clothing, which accounts for about 10% of the index, may drop 1% or so. But housing, a big 32% of the cost of living index, will rise. Fortunately, a drop in the cost of new homes and of home furnishings will probably offset most of the effect of an expected increase in rent.

Changes in other goods and services covered by the index will be slight. Some, like transportation, may drop a bit. Most of the others, like medical care, will probably rise. On balance, they will probably help push up the index a little—perhaps by about 0.5%.

After Mid-1954 What? . . . The course of living costs after mid-1954 will depend pretty much on the weather and on how the economy reacts to the expected declines in defense spending and capital investment by business. There will be more meat to eat next year, which means lower prices. And, weather permitting, there is pretty sure to be another near record crop of other foods—despite efforts in Washington to cut back on surplus production.

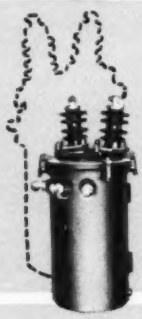
But the really important element will be the level of employment and personal income. If the expected slowdown in industries producing defense and other durable goods leads to a further drop in other industries—like home-building—demand for consumers goods would fall, and the cost of living might drop by several percent in a year. However, chances are that short of a serious business recession living costs will never drop much. Production costs are too high to permit it.

Balanced Performance

MOLONEY *HiperCore*
DISTRIBUTION TRANSFORMERS

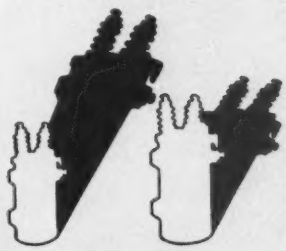
Just as this little fellow has to keep his mind on his work... so it is with a transformer ... it must keep working day and night. It must operate efficiently under normal conditions in addition to being able to handle overloads, surges, and what have you, without an interruption of service ... in short, *balanced performance.* Thus *balanced performance* cannot be achieved when one feature is emphasized at the expense of other features. Therefore, it would be well to check all the features of a transformer to be sure that it will perform as you want it to ... *continuously* and *efficiently.* We feel that such precaution will result in the selection of Moloney HiperCore Transformers for your distribution system.

ME53-27



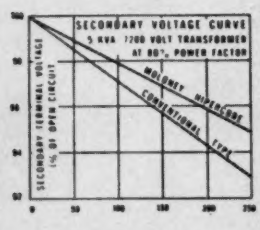
SMALLER SIZE

Moloney HiperCore Design most effectively takes advantage of the high permeability of cold rolled oriented grain silicon steel. This smaller, more efficient core-and-coil unit makes possible a smaller and lighter transformer than other methods of construction. Compactness and lighter weight result in greater ease of handling, storing and installing.



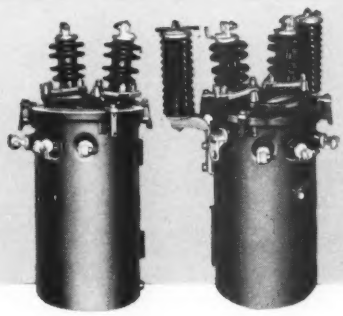
BETTER VOLTAGE REGULATION

The smaller cores of HiperCore Transformers make possible windings having lower impedance. Lower impedance provides lower internal voltage drop at all loads. This is especially important during peak load periods, since HiperCore Transformers can carry higher overloads at the same permissible regulation.



GREATER SHORT-TIME OVERLOAD CAPACITY

Moloney HiperCore Transformers have improved short-time overload characteristics which provide better peak load performance and longer life. Reduced coil mass, achieved through use of oriented steel cores, together with the extensive use of cooling ducts, results in more rapid cooling of the windings and in a lower hottest-spot temperature gradient.



Moloney HiperCore Distribution Transformers are available from stock in all standard ratings from 3 Kva up in both Conventional and CSP designs.

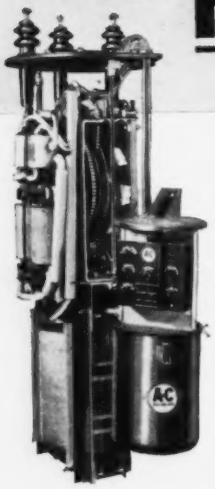
MOLONEY ELECTRIC COMPANY

Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control Transformers • Step Voltage Regulators • Unit Substations

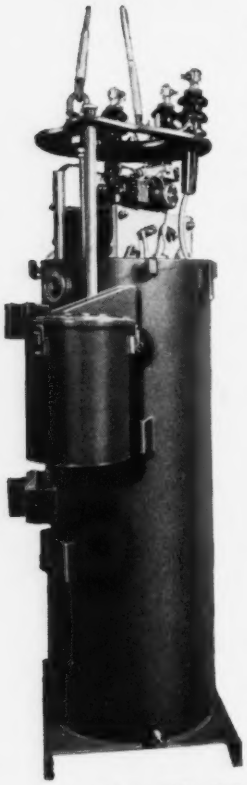
SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CANADA

LOOK INSIDE

Get the **FULL** *Profit Story*



Look at Design. Real proof of quality comes only from a point-by-point comparison when you look inside a voltage regulator. Inside an Allis-Chalmers distribution regulator you'll find the reasons why you get ± 1 volt accuracy and 20% range of regulation over years and years of relatively trouble-free operation.



Look at Workmanship. Unit construction — an exclusive feature of A-C 5/8% step voltage regulators — is the reason why you get highest quality workmanship. Transformer, mechanism, control, cover and bushings are built as an integral unit. As a result, *all* connections can be made before tanking. And inspection can be accurate and thorough — thanks to such easy accessibility.

Then...Look at the Record.
Only from Allis-Chalmers do you get field experience that proves accuracy and reliability. A-C distribution regulators have been turning in profitable field records since 1944 — and they are based on a total of 20 years of 5/8% step regulator experience. It will pay you to get all the facts. Call the A-C district office nearest you or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4104

ALLIS-CHALMERS

5/8% STEP VOLTAGE REGULATORS

RATINGS AVAILABLE

7620 Volts—15, 50, 100 amp
5000 Volts—50, 100 amp
2500 Volts—100, 200 amp

ALLIS-CHALMERS

Originators of 5/8% Step Regulation